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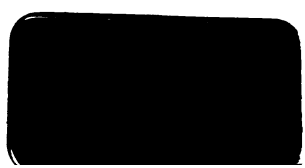

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A

SURE and EASY METHOD OF Improving Eſtates;

By PLANTATION of

Oak, Elm, Aſh, Beech, Birch, Platanus, Portugal Cheſnut, Horſe Cheſnut, Walnut, Lime, Service, Maple, Sycamore, Hornbeam, Quickbeam, Hazel, Fir, Pine, and all Kinds of Aquaticks, *&c.*

Wherein is Demonſtrated,

The Neceſſity and Advantage thereof;

WITH THEIR

Manner of Raiſing, Cultivating, Felling, *&c.* in all kinds of Soils, whereby Eſtates may be greatly improved.

TOGETHER WITH

An APPENDIX, of the Menſuration of Timber, after the Common Method; and the Deceitful way of taking Dimenſions.

LIKEWISE

Geometrical Rules for the true *Menſuration* thereof.

By *BATTY LANGLEY.*

The SECOND EDITION.

LONDON:
Printed for F. NOBLE, at *Otway*'s-*Head*, in St. *Martin*'s-*Court*, near *Leiceſter-Fields.* 1740.

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SURGERY METHOD

RC
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1740

To the Right Honourable, the

LORD VISCOUNT

TORRINGTON,

And to the reſt of the

Lords Commiſſioners

OF THE

ADMIRALTY.

My LORDS,

TO whom could I more juſtly inſcribe this Treatiſe of the Manner of Improving Lands *in general by* Plantations of Timber, *in* Great-Britain *and* Ireland, *than to thoſe who are by his moſt Gracious* Majeſty *entruſted with*

the Care and Direction of his Royal Navy; *the* BULWARK *and* GLORY *of* Great-Britain.

The Britiſh Nation *having been ſo renowned in all Ages, for its* Naval *and* Maritime *Affairs; ſhould it happen to a Supine Neglect in the preſent Generation of the Eſtated Gentlemen and Land-holders, that its Power and Commerce ſhould decay by Want of careful Plantations of Timber for our Naval Defence and Trade; What ill Conſequences muſt enſue to the Benefit of the People,* the Glory of his Majeſty's Navy, *and the Intereſt and Trade of this Country?*

Theſe Conſiderations, make me humbly preſume, My Lords, *to Dedicate the following Papers to your* Lord-

DEDICATION.

Lordſhips *Patronage and Protection, which are intended for the Service of my Country, and the* Intereſt *and* Glory *of* GREAT-BRITAIN *and* IRELAND.

I am your Lordſhips

Moſt Obedient

Humble Servant

Batty Langley.

Adverti∫ement.

To the NOBILITY *and* GENTRY *of* Great-Britain.

WHEREAS the Succeſs of Plantations wholly depends upon the well preparing of Soils, and adapting the ſeveral Kinds of Timber-Trees to their various Natures:

THESE are to give Notice, that the Author's Advice may be commanded to any Part of *Great Britain* or *Ireland.*

AS alſo, for the laying out, and planting of Gardens in general, after a *rural* and more *grand Manner*, than has been done before. And *Noblemens Eſtates* moſt accurately *ſurvey'd* and *mapp'd*, with curious *Proſpects* thereof: Alſo,

Grottoes, *Baths*, *Caſcades*, *Fountains*, *Canals* made, and *Engines* for raiſing Water to any Height required.

TIMBER meaſured and valued, either growing or fell'd.

AND in Conſideration that the juſt Menſuration of Timber being moſt expeditiouſly perform'd by the *Line of Numbers*, on the two Feet, or ſliding Rules; this is to inform the Curious, that the *moſt accurate Rules* for theſe Purpoſes, as well as all other *mathematical Inſtruments*, in *Silver*, *Braſs*, *Ivory* or *Wood*, are moſt exactly made and ſold, at very reaſonable Rates, by *Benjamin Scott*, at the *Mariner* and *Globe*, againſt *Exeter Change* in the *Strand*, *London.*

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INTRO-

INTRODUCTION.

I Having duly conſider'd the vaſt Quantities of Timber that have been felled, and employ'd in our Civil, as well as Naval Structures, in this preſent Age; and the ſmall Quantities propagated, for a Succeſſion; find that, if Plantations thereof are not ſpeedily made, our Nation will be entirely exhauſted of building Timber, before ſixty Years are ended.

Indeed, at this very Juncture, we have very little building Timber in our Woods and Foreſts to boaſt of, and are already much oblig'd to Foreigners, for great Quantities, for our Civil Uſes: But ſhould we ever happen (which God forbid) to be obliged to purchaſe of them Timber for our Shipping, (by want thereof at Home) 'tis to be feared, that this glorious, and now powerful flouriſhing Nation, that governs the Seas, muſt ſubmit to every Invaſion that's

that's made, for want of its wooden Walls of Defence.

Mr. *Evelyn*, above fifty Years ago, wrote a Treatiſe on the Propagation of Foreſt Trees: Wherein he Reports in his 33 *Chapter, Page* 207. " That in the great Expe-
" dition of *Eighty Eight*, it was expreſsly
" enjoin'd the *Spaniſh* Commanders of that
" Signal *Armada*; that if when landed,
" they ſhould not be able to ſubdue our
" Nation, and make good their Conqueſt,
" they ſhould yet be ſure not to leave a
" Tree ſtanding in the Foreſt of *Dean*: It
" was like the Policy of the Philiſtines,
" when the poor Iſraelites went down to
" their Enemies Smiths to ſharpen every
" Man his Tools; for as they ſaid, *leſt the*
" Hebrews *make them Swords, or Spears*;
" ſo theſe, *leſt the* Engliſh *build them*
" *Ships, and Men of War.*

But, beſides this Neceſſity of national Security, the Advantages and Pleaſures thereof are ſo very great, that in my humble Opinion, there's not one ſingle Gentleman, but will purſue the Pleaſures and Profits thereof; altho' 'tis true, that ſome may ſay, That to make Plantations of Timber Trees now, that will not be

ſale-

ſaleable under thirty or forty Years hence, when they may be in their Graves, will be no Advantage to them; yet, I muſt beg leave to inform all ſuch (who make no Proviſion for Poſterity) that every Year after ſuch Plantations are made, their Lands are always encreaſing their Value, as the Trees advance in Growth. So that even at the End of the firſt Year after Planting, were their Eſtates to be ſold, they are of a much more conſiderable Value, than when naked thereof. Beſides, the Expence therein at the firſt is very inconſiderable, and the Pleaſures thereof very great. Which will plainly appear in the following Sheets.

Before that I proceed to the Culture of the following Vegetables, There are two Operations of Nature, that I muſt explain, for the right underſtanding thereof, *viz.* The Force with which Nature imbibes Nouriſhment for their Support; and the Power with which ſhe diſcharges the crude Part thereof by Perſpiration, to permit a Succeſſion.

That Vegetables imbibe Nouriſhment at their Roots, I need not give my ſelf the Trouble to explain, it being known to many, and believ'd by every one; but that Vege-

Vegetables do alſo imbibe Nouriſhment at their Leaves, as well as perſpire it away there alſo; there's but few that are acquainted therewith. And ſince that the Succeſs of our Labours do's wholly depend upon the Knowledge thereof, I will illuſtrate the ſame by Experiments.

EXPERIMENT I.

To prove that the Branches of Trees will imbibe Water at their extream Parts, when cut, at Pruning, Lopping, &c.

I Made choice of the Branch of an Elm Tree, that grew almoſt perpendicularly, whoſe End I cut off, where its Thickneſs was about an Inch Diameter. On the extream of the remaining Part of the Branch I cemented a Glaſs Tube, which I filled with Water, that was imbibed by the Branch with ſuch Velocity, that in 12 Hours, (*July* 20) it imbibed one *Winchester* Quart.

To the like Stem of an Oak, I cemented on another Tube, which imbib'd in the ſame Time near one Pint. But the Branch of an Aſh, of the ſame Diameter, in the ſame Time imbib'd near three Pints.

This Experiment explains to us; that Timber Trees imbibe great Quantities of Wet, (when unskillfully pruned or lopp'd,) which cauſes their Arms and Bodies to decay and grow rotten, to the great Prejudice of their Proprietors.

EXPERIMENT II.

To prove that Vegetables imbibe Nouriſhment at their Leaves, viz. *Dews, Rains,* &c.

IN *April* 1727, I cover'd with Sail-cloth, divers Lime, Elm, Oak, Apple, Cherry and Pear-Trees; ſo that their Branches were totally depriv'd of the Benefits of Rains, Dews, *&c.* But their Roots I kept ſupply'd with ſufficient Quantities of Moiſture. In this State I continu'd them until the End of *July*, at which Time their Leaves in general were turn'd yellow, and the Shoots that they had made, were alſo yellow and very weak. The ſame kind of Trees planted cloſe to the aforeſaid, that had enjoy'd a free open Air, were very healthy and green, and, during the ſame Time, produc'd very ſtrong Branches.

At the ſame Time, I made Choice of particular Branches of ſeveral Trees, which I cover'd as aforeſaid; which Branches grew very little, and their Leaves turned yellow; whilſt the others that poſſeſs'd the free open Air were green, in a healthy State, and greatly advanced in Growth.

This Experiment proves, that altho' their Roots were plentifully ſupply'd with Moiſture; yet, for want of a free Air, their Health was impaired, and conſequently their Growths retarded. The Reaſons whereof I will hereafter declare in Experiment III.

We are by this ſhewn, that when Trees are planted cloſe to each other, their lower Branches that are ſhaded by the upper ones, muſt periſh in the like Manner.

I planted divers Foreſt Trees in large Flower Pots, and in *June* I ſuffer'd them to grow very dry for want of Water. In the Evenings, when the Dews began to fall, I weigh'd divers of them very exactly, and cover'd the Surfaces of their Pots with Coverings, to prevent the Dew or Rain from falling on the Earth. Then the next Morning, at Sun riſing, I took away their Coverings, and weighed them again,

again, and found that they had encreas'd many Ounces in their Weights, which Encreaſe of Weights were the Quantities of Moiſture imbibed by their Leaves; and when little or any Dews fell, then was their Encreaſe very ſmall; and on the contrary, when great Dews or Rains fell, then their Encreaſe was much greater. In like Manner I cover'd Pots, wherein other like Trees, of the ſame Kinds, were planted, whoſe Leaves I pull'd entirely off: But their Weights were never augmented any Thing conſiderable; even when Rains fell for 24 Hours together.

THESE nocturnal Augmentations are plain Proofs that Vegetables imbibe great Quantities of Moiſture at their Leaves as well as Roots, that in great Meaſure ſupports them in very hot and dry Seaſons; and therefore it follows, that we ſhould always take Care to plant them at ſuch Diſtances, that they may enjoy a free open Air in all their Parts, ſo as to receive the full Benefits of thoſe great Bleſſings, the Rains and Dews of Heaven.

EXPERIMENT III.

To prove that the crude Part of the Nourishment, imbibed by Vegetables, is perspired away at their Leaves, and the ill Consequences attending when their Perspirations are retarded.

IT having been a general received Opinion, that the whole Moisture imbibed by Vegetables was always contained in them, and converted to the Formation of Sap, Buds, Leaves, Shoots, &c. may make this Account of the Perspiration of Vegetables seem something strange, until Experience make it familiar.

THE redundant watry Fluid, in the Sap of Vegetables, is perspired away at their Buds, Blossoms, Leaves, and Fruits. But the greatest Part is at their Leaves, wherein are their main excretory Ducts, that separate and carry it off, leaving the most nutritive Parts in the Plant to coalesce.

To prove the Perſpiration of Vegetables, I proceeded as follows.

Firſt, I Provided a large earthen Flower-Pot, that was well glazed within, without any Holes in its Bottom, as is uſual for Flower-Pots to have; which I fill'd with good Loam, and therein planted an Apple Tree. This Work I perform'd in *October*, that the Plant might have got good Roots by the *May* following, when I began my Experiment.

My Tree being thus planted, and the Spring come on, it then began to advance in its Growth, and therefore I did then provide my ſelf with a thin Plate of mill'd Lead, made fit to the Mouth of the Pot, leaving a Hole or Gap for the Stem, and therewith cover'd all the Surface of the Earth in the Pot, and with ſoft Cement, ſecured the Edges as well at the Hole as at the Stem.

When the Earth was thus cover'd, the Sun could not exhale away any of the Moiſture of the Earth contain'd in the Pot.

And as the Plant, in the Experiment, would require Moiſture; and 'twas neceſſa-

ry that the external Air ſhould have a free Communication with the Air, under the Plate of Lead: Therefore I provided two Glaſs Tubes, the one about three Quarters of an Inch Diameter, and three Inches long, and the other one Fourth of an Inch Diameter, and about a Foot in Length; which I cemented over Holes, cut in the Plate of the ſame Diameters: The ſmall Tube I left open, for a free Communication of the Air, and the great one I kept ſtopt with a Cork. The uſe of this large Tube was, to give the Plant Water at; which, when done, I carefully ſtopt, to prevent any Vapour paſſing thro' the ſame.

My Plant being thus prepared, I put it into a Scale, and took an exact Account of its Weight, Morning, Noon, and Night, which I noted down; as alſo the Weight of Water, when I gave it any. From whence I could diſcover the Quantities imbib'd and perſpired every Day and Night, as well as the Times of Morning, Afternoon, and Night. I alſo plac'd a Thermometer by by my Plant, which diſcover'd at every Degree of Heat and Cold, the different Powers of imbibing, (when 'twas in an imbibing State,

State, as at Night) and perſpiring (in hot and dry Days).

THIS Experiment diſcover'd to me the Demands that Plants make for Moiſture in hot and dry Seaſons, by the Quantity perſpired away in a hot Day, whoſe Weight was deficient upon weighing at Night, and alſo, that they are nouriſh'd, by imbibing the Dews at their Leaves and Branches, which appear'd by their extraordinary Weight, gain'd ſince the Night preceding, when laſt weigh'd.

BY obſerving the Quantities perſpired away in hot and dry Seaſons, I found, by comparing the Quantities of Water given, therewith the Neceſſity of Waterings at thoſe Times, as well as the little Occaſion for it, in wet and cold Seaſons, when Plants perſpire very little.

IT has been prov'd by the Reverend Mr. *Hales*, (to whom I am much obliged) in his vegetable Staticks, that a ſmall annual Sun-Flower, not quite four Feet high, imbibed and perſpired in twelve Hours Day, one Pound and fourteen Ounces, Averdupois Weight, when the Weather was very warm and dry; and in more moderate Weather one Pound four Ounces.

In order to diſcover the Power of Perſpiration, I cut off from divers Fruit Trees, ſeveral thriving Branches, that were at their tranſverſe cut, ſomething more than half an Inch Diameter.

Then being provided with Cement, and Glaſs Tubes ſomething larger in their Diameters, than the Branches; I cemented them to their Ends, as before in the preceding Experiments.

Which being done, I fill'd the ſeveral Tubes with Water, and hung them with their Branches in the open Air; I alſo fix'd Tubes to other Branches of the ſame Kinds and Sizes, which I alſo fill'd with Water, but their Branches I immerſed in Veſſels of Water.

Those Branches that were expoſed to the free Air, imbibed the Water plentifully, whilſt the others immerſed in the Water did not imbibe one twelfth Part the Quantity. Then I took them out of the Water, and expoſed them to the free Air, and they imbib'd the Water in the Tubes with much greater Force.

I continued theſe Experiments for many Days, during which Time the Weather altering from hot and dry, to cool and wet,

I could

I could daily diſcover their different Perſpirations, and obſerv'd, that in very hot and dry Days they would imbibe and perſpire very great Quantities, and in wet and cool Weather, very little.

If I let any of thoſe Branches immerſed remain in the Water, for four or five Days; thoſe ſmall Quantities that they would imbibe the firſt Day, did always grow leſſer and leſſer every Day after; ſo that generally about the fifth Day, they were ſaturate, and would not imbibe any more. But when I took them out of the Water, and hung them with their Tubes fill'd with Water in the open Air, they would, after an Hour's Time, or thereabouts, begin to imbibe and perſpire, as thoſe that had not been immerſed.

I fix'd in the ſame Manner other Branches, that were ſome of them wholly diſleaved, and others but in Part, as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{3}{5}$, &c. and found, that they all imbib'd the Water, with a Force proportionable to their Quantity of Leaves.

Thus thoſe without any Leaves imbib'd but very little, thoſe with half their Leaves, with half the Force that the others did, that

had all their Leaves, and the others proportionably.

Now, ſeeing that the Branches immerſed in Water could imbibe nothing near the Quantities of Water, that the others did in the open Air, we may ſee from thence the great Benefit thereof, in perſpiring it away to make Room for a Succeſſion. This Experiment proves the Reaſon of the yellow Leaves in Experiment II. and why Fruits are inſipid and crude, in very wet and cold Summers; for Want of a due Mixture of dry Weather, to enable the Air to carry off the very great Quantities of Moiſture in a kindly Manner, whereby Plants would be kept in a healthy State. And by this Experiment 'tis demonſtrable, that Fruit Trees being planted too near unto one another, when the Air cannot have a free Circulation, as in Orchards planted like Thickets; they cannot diſcharge the confin'd Vapour in their ſhady Parts by a free Perſpiration; and therefore their Fruits are inſipid, ill colour'd, and of little Value.

And 'tis always ſeen, that our beſt Winter Aples and Pears that are produc'd in a very wet Summer, are of a flaſhy Conſtitution, and rot ſoon after being gather'd (nay,

(nay, oftentimes upon the Trees) for the crude watry Vapour remaining in them, that ſhould by Heat have been perſpired away, Nature cannot give them their true Taſte and Colour, after its own Manner and are therefore immature, and 'tis that Immaturity that cauſes their inſipid watry Taſts, and immediate Decay.

THE only Help in this Caſe, is, to plant the Trees at ſufficient Diſtances from each other, and keep them pruned thin of Wood, that what Heat does happen in very wet and cold Summers, may have free Acceſs to the Fruits, whereby that crude Vapour may, in Part, or wholly, be perſpired away; which cannot be performed, when trees are cloſe planted, and full of Wood, for Want of Care and skilful Pruning.

AND beſides this Advantage, there is another very great one, that ariſes from it, which is having the Fruit produced in much greater Perfection; for when Fruit Trees are planted at proper Diſtances, that they have a free Perſpiration, and Nature charg'd with no greater a Burden, than ſhe can eaſily ſupport; 'tis from them that we receive our fineſt and beſt taſted Fruits: But this will be fully demonſtrated in my *Pomona*,

ſe, in that Part which exhibits the Manner and Diſtance of planting Fruit Trees in general.

It is upon theſe Principles preceding, that Foreſt Trees in their natural Growth form a parabolical Figure; for as the Plant advances in Height, from its Kernel, Layer, &c. to its utmoſt Altitude, Nature puſhes out divers lateral Branches by the Dilatation of the Sap; which being placed in Order above each other, do thereby receive it in ſuch Quantity, as the Situations and Magnitudes of the ſeveral Branches are to each other. Thus the firſt Branches being inſerted in the largeſt Parts of the Stem or Body, and neareſt the Roots, do receive the Sap in greater Quantities than thoſe that are immediately above them; and ſo on throughout the whole, to the very Top, or leading Shoot of the Tree. And ſince that the lowermoſt Branches do thus receive the greateſt Part of the Sap, 'tis therefore that they exceed the Growths of thoſe next above them; which being furniſh'd leſs and leſs, as they are farther and farther from the Roots, ſo doth their ſeveral Growths diminiſh upwards, from whence

is

is cauſed, thoſe beautiful paraboliçal Figures that Foreſt Trees appear in.

As the Plants advance in their Growths, the Leaves of their upper Branches become too powerful for thoſe that are next below them; ſo that their lateral Branches periſh, for Want of the warm Sun, and free drying Air, to perſpire off their crude Sap, with which they are ſaturate. So that afterwards all the aſcending Sap is drawn to the extreme Parts of the Branches, that are expoſed to the free drying Air, where they perſpire it freely, and expand very much.

When Trees are planted very near together, their lower lateral Branches are overſhaded by their upper ones, as noted before in the laſt Paragraph. This over and above Shade, hinders the Perſpiration of the lower Branches, whereby they are ſaturate with Sap, and therefore cannot receive freſh Nouriſhment, whilſt thoſe at the Top enjoy the free Air, and perſpire plentifully.

This plentiful Perſpiration draws the Sap to the Top with great Force, whereby Trees advance greatly in their Heights, and not by an Emulation, as Mr. *Bradley* ſays they have, to overtop the reſt. *Vide* his new

new Improvements on Planting and Gardening, Part 3, Page 224, on the raiſing of of ſeedling Orange Trees.

NOW, ſeeing that the Height of Trees is much accelerated, by their being nearly planted to each other, we are hereby taught how to raiſe Walks, Avenues, Blinds, *&c.* in much ſhorter Spaces of Time, than when planted at ſuch Diſtances, as to have a free circulating Air about them; but I don't recommend the Practice hereof, where Poſterity is to be provided for, becauſe that Plantations of this Kind are of a very ſhort Duration.

TO better underſtand, that the cloſe Planting of Trees is the real Cauſe of their aſpiring Heights, and Decay of their lower Branches, I will farther explain it.

IT is always ſeen, that when Woods or Groves of tall Trees, that ſtood very near together, are cut down, there be left here and there a ſingle Tree; that thoſe ſingle Trees do immediately throw out vigorous Shoots in their lower Parts, which before periſh'd for want of a free Air, and their Top Branches, which before thriv'd only, then are deprived of the Sap, by the new produced Branches at the Bottom,

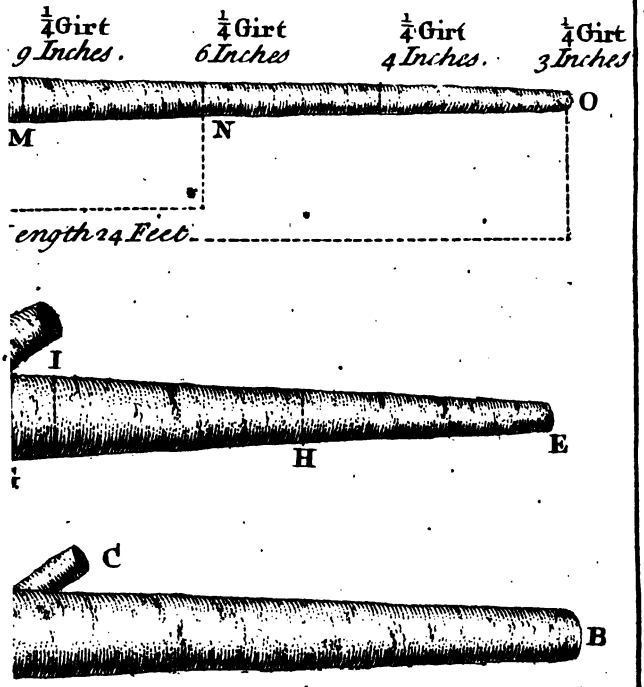
tom, whereby they are in a languiſhing State, and at length die. This is an undeniable Proof, that wants no corroborating Evidence.

THE Want of a free Air, circulating about Trees that are thick planted, ſhews the Neceſſity of pruning their Branches and Limbs, to give the Air a free Acceſs: Which Pruning muſt be diſcretionally performed, or otherwiſe we may by Chance kill the Top of your Trees, by letting in the Air ſo freely at their lower Parts, as before obſerved: For when the lateral Branches of Trees are vigorous, and make very ſtrong Shoots, they do attract Nouriſhment with ſuch great Force, that their aſpiring Growths are check'd; and it is therefore, that the Side Buds of young Trees that break out in the Spring, ſhould be rubb'd off, at their firſt Appearance; for when they are ſuffer'd to grow all the Summer, as is cuſtomary, they greatly check the Growth of the Plants.

THEREFORE when Layers, or Seedlings of any Sort of Tree are planted out in Nurſeries, that are deſign'd to make ſtandard Trees, thoſe lateral Buds ſhould be diſ-

diſplaced, when they firſt appear in the Spring. And particularly Foreſt Trees, that are deſign'd for Timber; for when their lateral Buds are ſo diſplaced, their Bodies are clear from Knots, and become ſtreight and clear Timber.

CHAP. I.



	in.	H
Mean girt 9 quan:		13: ½
15 Inches quantity.		12: ½
9 Inches quan.....		4: ½
4 ½ Inches quan. .:.		1: 1/10
I, & N O, ...		18: 1/10
of K O, ...		13: ½
Difference...		4: 6/10

½ the true Solidity of K O.

CHAP. I.

Of the OAK.

Its Manner of raiſing for Timber in Parks, Woods, Foreſts, Coppices, &c.

THAT noble Tree the Oak is found to extend its Herculean Arms much farther, when its Soil is a deep ſtrong Loam, than in ſhallow light Lands. There are two Kinds of Oaks that are worth our Notice.

THE one is called *Quercus Sylveſtris*, whoſe Grain is hard and black, producing a very ſmall Acorn; extending its lower Branches very far from the Trunk, as alſo its Roots, and thoſe very near to the Surface of the Ground.

THE other Kind is called *Quercus urbana*, which grows much ſtreighter and higher than the former, making very ſtreight clear Timber, extending its Roots very deep in the Ground. The neareſt Diſtance in this laſt Kind, muſt not be leſs than thirty five Feet, when planted in Walks and Avenues, and the former, fifty Feet. But when they are planted out for Timber in Parks, *&c.* the firſt ſhould be at ſixty or ſeventy, and the laſt about fifty or ſixty Feet Diſtance.

THE Statute made in the 35 *Hen.* 8. for the Preſervation of Oak Trees, enacts, That on every Acre of Coppice Wood, that ſhall be felled at twenty four Years Growth, or under, there ſhall be twelve Standils of Oak left unfelled, *&c.*

NOW, imagine that ſuch a Number of Oaks were equally diſpoſed throughout the whole Acre; then each Tree would have a ſquare Space of thirteen ſquare Rods, and one third to it ſelf. To avoid Fractions, the ſquare Root of thirteen, one third, is almoſt three and three Fourths, which is the Diſtance of each Tree, when equally diſpoſed on an Acre.

THREE

THREE Rod, and three Fourths, being nearly equal to ſixty two Feet, comes much to the ſame Diſtance, that I have before directed.

THE Diſtance of thirty three Feet, aſſigned for Oak Trees, intended for Timber by Mr. *Bradley*, in his new Improvements, Part I. Page 42. is in my humble Opinion, much too near, more eſpecially where Underwoods are to be ſown or planted between them. The ill Effects of cloſe planting, being already proved by many Inſtances, doth ſufficiently ſupport the Truth hereof: Nor is the Timber near ſo good, when Trees are very cloſe, as not to have a free Air, to perſpire away the Crudities of their Sap. Of this *Pliny* takes Notice, that the Timber of thoſe Trees, which grow in moiſt and ſhady Places, is not ſo good, as that which comes from a more expoſed Situation: Nor is it ſo cloſe, ſubſtantial and durable. 39 *Cap. Lib.* 16.

BUT however, it may be, that Mr. *Bradley* might conſider the Diſtance of the Oak, when planted, or raiſed in very rough ſtony Grounds, and ſtrong Clays, wherein they are very long, before they arrive to

any conſiderable Magnitude; but at length the beſt of Timber.

OAKS that are produced in light ſandy Lands, have a very ſmooth Grain, and thoſe in a moiſt Soil, frow and brittle.

THE Growth of Oaks being much ſlower than moſt other Foreſt Trees, are therefore to be planted in Lines by themſelves, that they may riſe up together, and not be dripp'd by other Trees of a quicker Growth.

THE beſt Oaks are raiſed from the Acorn, and eſpecially thoſe that grow in ſtony Lands, provided, that the Acorns were perfectly mature, and gather'd from Trees of a good Kind, which ſhould be carefully obſerved, or otherwiſe after many Years are paſt, we may fail of our deſired Succeſs.

FOR the Manner of raiſing Oaks in a Nurſery, I refer you to the third Part of my new Principles of Gardening, Page 120. And for the ſeveral Uſes of its Timber, to the many Structures, both civil, naval and military, that are built therewith.

Ob-

Obſerve its Praiſe, as given by Rapin.

Si quando armanda naves & bella paranda,
Det quercus nautis tabulata, det arma furori
Bellantum; det ligna foco, det aratra colono,
Aut aliis porro ſumatur in uſus.

When Ships for bloody Combat we prepare,
Oak affords Plank, and arms our Men of War,
Maintains our Fires, makes Ploughs to till the Ground;
For Uſe no Timber like the Oak is found.

THE beſt Time to furniſh ourſelves with the Seed of this noble Vegetable, is at the End of *October*, or Beginning of *November*, when they naturally fall from their Cups; wherein obſerve, that the beſt Acorns are thoſe that grow upon the extreme Parts of the Tree, where they have always enjoyed a free Air, and natural Perſpiration, which renders them mature, ponderous, and ſound.

THE Seaſon for ſowing them, we are told by Nature herſelf, if we do but obſerve her Methods of Working. For as ſhe has no other Preſervatory than the Earth it ſelf, ſhe therefore commits them to it, as ſoon as

ripe; ſo that the Seaſon to ſow or plant the Acorn, is, as ſoon as perfectly ripe.

Obſerve, Lucret. l. 5.

Nam ſpecimen ſationis, & inſitionis origo
Ipſa fuit rerum primum natura creatrix:
Arboribus quoniam baccæ, glandeſque caducæ
Tempeſtiva dabant pullorum examina ſubter, &c.

Nature herſelf who all created firſt
Invented ſowing, and the wild Plants nurſt:
When Maſt and Berries from the Trees did drop,
Succeeded under by a numerous Crop.

If we would propagate the Oak in Lands that are very wet and cold; ſuch as low Clays, &c. 'tis beſt to preſerve the Acorns in very dry Sand, until the Spring; otherwiſe they will ſhoot out their Radicles before the Seaſon of planting, and be in danger of being ſpoiled.

There can be no certain Time, in the Spring, aſſigned for this Work, becauſe that Seaſons differ very much; ſome Years the Spring is later by a Month, than 'tis of other Years; therefore when it appears, that the Froſts and extream Cold of the Winter are over, and the Spring advances, which

which is always in *February* or *March*; then is the Time to ſow or plant your Acorns, and other ſuch like Seeds ſo preſerved.

AFTER ſowing, 'tis the Nature of all Kinds of Seeds, to puſh their Radicles perpendicularly into the Earth, to ſearch after, and imbibe Nouriſhment for the Support of their tender Plumes, or firſt leading Shoots. And 'tis therefore that we are obliged to draw the young Seedlings of many Sorts of Plants after one or two Years growth, to prune their Radicles or perpendicular Roots, (called, by Gardeners and Nurſery-men, *Tap-Roots*;) which cauſe their lateral Roots to extend themſelves horizontally. Thus Hollies, Yews, Pear-Trees, *&c.* are cauſed to have great Quantities of horizontal Roots, by pruning away their leading Tap-Roots, which cauſes them to grow very ſhallow, and conſequently imbibe the richeſt Juices of the Earth that always lie near to the Surface.

AND it is from this, that the often tranſplanting of Trees in Nurſeries cauſes them to be much better rooted, and more likely to grow, than thoſe that have been very ſeldom or ever removed, ſince

their firſt tranſplanting from the Seed Bed. And ſince that the Succeſs of Plantations does in great Meaſure depend upon the Goodneſs of Roots, we ſhould therefore be careful, how we buy Trees from Nurſeries, where they have grown without being tranſplanted every third or fourth Year at longeſt.

But for Oaks, and other Timber Trees, I adviſe that you plant the Acorns, *&c.* in the Places where they are deſigned to remain; for they not only produce the ſtreighteſt Timber, but much ſooner than thoſe that are checked by often tranſplanting. Nor is there that trouble in their ordering, for when they are raiſed from Acorns, *&c.* they need no watering, ſtaking, *&c.* which tranſplanted Trees of large Statures do.

It is the Opinion of many, who have obſerved young Seedlings, which Nature had ſow'd in the Woods, to grow ſcraggy, and eaten up (as it were) by Moſs: That to let Seedling Oaks remain in the Places where they are ſown, is not ſo advantageous as to raiſe them in, and tranſplant them from Nurſeries: But as the Acorns, which we propoſe to plant, are always to enjoy a free

and

and open Air, free from the Drip and Overſhade of their Mother Trees, they will therefore thrive as deſired, and become ſtately Trees; which thoſe cannot do that have not a free Perſpiration, which renders them immature, as has been before proved by many other Inſtances.

Of this *Virgil* takes Notice, *Georg.* 2.

Creſcentique adimunt fœtus uruntque ferentem.

Thus Engliſh'd.

Which checks their Growth, and makes their Bodies pine.

THESE Reaſons are ſufficient to inform us, that 'tis much better to plant the Acorn in its intended Situation, than to ſow it in a Seed-Bed, and afterwards tranſplant it as other Trees. But hear what the learned *Rapin*, who well underſtood the vegetable World, ſays thereof,

—— Quamvis ipſa de ſtirpe parentis
Pullulet, & tenues tollat ſe quercus in auras,
Aut mutata ſolo, ramis exultet opacis;
Forma tamen nemoris non ſit mihi gratior ulla,
Quam quod per campos, poſito de ſemine, crevit;
Et quanquam ſit agro prælongum tempus inerti
Ducendum, ac tardæ ſurgant de ſemine quercus;
His tamen, his longe veniunt felicius umbræ.
Nam certum eſt de glande ſatas radicibus imis
Altius in terram per ſe deſcendere plantas,
Majoreſque adeo in cœlum profundere ramos.
Seu quod dediſcant mutatam ſemina matrem,
Degeneremque ferant alieno ex ubere prolem:
Sive quod ipſa bicognatæ inoleſcere terræ
Glans primo melius paulatim aſſuevit ab ortu.

Rapinus Hort. l. 2.

—— Tho' Suckers which the Stock repair,
Will with thick Branches crowd the empty Air,
Or the Ground Oak tranſplanted Boughs may ſhoot;
Yet no ſuch Groves do's with my Fancy ſuit,
As what from Acorns, ſet on even Rows
In open Fields, at their due Diſtance grows.
What tho' your Ground long Time muſt fallow lie,
And ſeedling Oaks yield but a ſlow Supply?
No Walks elſe can be for like Beauty prais'd,
For certain 'tis, that plants from Acorns rais'd,
As to the Centre deeper Fibres ſpread,
So to the Zenith more advance their Head;

Be

Be it that Plants for natural Moiſture pine,
And as expos'd, at Change of Soil decline;
Or that the Acorn, with its native Mold,
Does thrive, and ſpread, and firm Alliance hold.

WHEN the Seaſon for ſowing of the Acorns is near at hand, the Land muſt be well prepared for them; for thereon depends the whole Succeſs. For when Lands are not prepared, to receive the Seed, 'tis impoſſible that the young Plants can thrive: Therefore we are to proceed therein as follows.

HAVING made Choice of the Land, (which is ſuppoſed to be clear of Buſhes, Furze, Broom, *&c.*) ſet out their ſeveral Diſtances, and at every of them, dig Holes about two or three Feet deep, and about four Feet Diameter, laying the Earth, that comes out, in ſmall Hills or Ridges, of ſuch a Thickneſs, that the Winters Froſts may thoroughly freeze and meliorate the ſame. Which Work therefore ſhould be performed early in the Winter, or rather in the End of the Autumn.

THIS early expoſing of the Earth to the open Air, cauſes it to be by the Spring (when 'tis the Seaſon for planting your Acorns)

corns) finely ſweeten'd, and fit for their Reception.

In the Spring, when the Froſts are over, fill up all the Holes, laying the Turf (if 'tis a green Sward) at the Bottom, and the Remainder at Top; forming the Surface thereof ſomething concave, the better to retain the Spring and Summer Rains, and in the Centre of each, plant five or ſix Acorns, at about eight Inches apart, and four or five Inches deep; and the next Year following, draw from each, all that are unneceſſary for Uſe, leaving the moſt healthy one of every Hole to continue.

That our young Plantation may make all the Progreſs that is poſſible, we muſt be careful to keep them houghed clean in the Summer from Weeds, and to dig the Earth about them at the End of every Autumn; not only to meliorate the Surface of the Earth, but for the kindly receiving the Winters Rains, wherein is contained much Salt and Sulphur, that contributes to the ſpeedy Growth of Vegetables.

Obſerve

Obſerve the Advice of *Rapin* hereon.

Proinde nemus ſparſa cures de glande parandum:
Sed tamen ante tuo mandes quam ſemina campo,
Ipſe tibi duro robuſtus vomere foſſor
Omne ſolum ſubigat late, explanetque ſubactum:
Cumque novus fiſſo primum de germine ramus
Findit humum rurſus ferro verſanda bicorni,
Conſita vere novo tellus, cultuque frequenti
Exercenda, herbæ circum ne forte nocentes
Proveniant, germenque ipſum radicibus urant.
Nec cultu campum cunctantem urgere frequenti,
Et ſaturare ſimo pudeat, ſi forte reſiſtat:
Culturæ nam triſtis humus ſuperanda colendo eſt.
Lib. 2.

Then ſee your hopeful Groves with Acorns ſown,
But e'er your Seed into the Field be thrown,
With crooked Plow firſt let the luſty Swain
Break up, and ſtubborn Clods with Harrow plain.
Then when the Stem appears, to make it bear,
And lighten the hard Earth with Hough, prepare,
Hough in the Spring; nor frequent Culture fail,
Leſt noxious Weeds o'er the young Wood prevail:
To barren Ground with Toil large Manure add,
Good Husbandry will force a Ground that's bad.

WHERE we intend a perfect Wood of Oaks, they may be planted, at about forty Feet

Feet Square of one another, but not nearer; for when they are cloſer planted, they have not a ſufficient Quantity of Air for Perſpiration.

'Tis a Cuſtom to ſow aſhen Keys amongſt Plantations of Oak, but I cannot recommend that Work to be done, when we plant our Acorns; for tho' their Keys will not come up, until the ſecond Year after ſowing, yet their Growths are ſo quick to that of the Oaks, that, by over-growing and dripping them, they are greatly injur'd thereby. And the Profit which ariſes from an Acre of Aſhen Poles, in five or ſix Years, is ſo inconſiderable, that none, for ſo ſmall a Gain, would injure the Growth of our moſt valuable Plantation. Therefore I adviſe, that Plantations of Oak be kept free, until they have ſeen ſix or ſeven Years paſs'd; after which aſhen Keys, or the Seeds of any other Underwoods, may be ſown amongſt them, without the leaſt Prejudice. And as I have now explained the Manner and Diſtances, at which theſe noble Trees ſhould be planted, in both Park and Coppice, I ſhall therefore conclude with the following Admonitions, *viz.* That they are carefully preſerved, whilſt young, from Cattle; for when

when ever they loſe their leading Shoots by being cropt, our Hopes, are over; for as ſoon as they loſe the leading Shoots, they inſtantly become Pollards, which never make good Timber.

You muſt alſo with Care and Diligence diſplace all the lateral Buds in the Spring; for the fewer are ſuffer'd to grow, the more the Trees will advance in Height, and produce the cleaneſt Timber, as before noted.

Your Plantations being thus order'd, you'll find that your Trees will be always in perfect Health, free from all the common Obſtructions, that are daily ſeen (for Want of good Care in their Management,) that ſo much retards their Goodneſs and Growth.

The Seaſon for felling this ſtately Tree, when 'tis arriv'd to be goodly Timber, is in *April;* and by 1 *Jacobi.* Oaks for Tanners Bark may be fell'd from *April* to the End of *June.*

'Tis a great Pity, that this ſtately Tree ſhould be fell'd, before 'tis fully arrived to its utmoſt Maturity, as is too commonly done by many.

To prevent which, the aforementioned Statute 35 *Hen.* 8. enacts, that the twelve Standils of Oak to be left upon an Acre, ſhall

ſhall not be cut down, until they are ten Inches ſquare, within three Feet of the Ground, on Forfeiture of three Shillings and four Pence for every Standil ſo cut, to be divided between the King and the Proſecutor; but 'tis a pity that they ſhould be cut down, until they are two Feet Diameter, at twelve Feet from the Ground.

One Acre of Oaks planted at forty Feet Diſtance from each other, will contain twenty ſeven Trees, which in twenty Years Time, will be worth as many Pounds Sterling at leaſt, beſides the Value of the Underwood that may be raiſed, in the laſt twelve Years of the twenty.

In *England*, there are many thouſand Acres of good Land which lie waſte, and great Quantities let for five or ſix Shillings an Acre *per Annum*; which were they thus planted, what vaſt Improvements would an Age or two produce?

Thus by laying out at the firſt Preparation of the Holes, about as many Shillings, with a little Care afterwards, in keeping them free from Weeds, *&c.* we may receive above twenty *per Cent.* more than at preſent. There are many Gentlemen in *England*, that poſſeſs upwards of a thouſand

Acres of Land to each Share, that does not bring them in yearly more than five Shillings *per* Acre, and ſome not half ſo much, ſo that one thouſand of ſuch Acres are worth but two hundred Pound *per Annum*, and twenty Years Rents produce but four thouſand Pounds, the compound Intereſt excepted. But the Truth hereof is manifeſted by the following Account.

See the Calculation.

	l.	*s.*	*d.*
The Rent of one thouſand Acres of Land at 5 *s. per* Acre for the firſt Year	200	0	0
For the ſecond Year	200	0	0
The Intereſt of the firſt Year's Rent at 5 *l. per Cent.*	10	0	0
Sum	410	0	0
The third Year's Rent	200	0	0
The Intereſt of 410 *l.* at 5 *l. per Cent.*	20	10	0
Sum	630	10	0
The fourth Year's Rent	200	0	0
The Intereſt of 630 *l.* one Year at Ditto	31	10	0
Sum	862	0	0

	l.	*s.*	*d.*
Brought over	862	0	0
The fifth Year's Rent	200	0	0
The Intereſt of 862 *l.* one Year	43	2	0
Sum	1105	2	0
The ſixth Year's Rent	200	0	0
The Intereſt of 1105 *l.* 2 *s.* one Year	55	5	0
Sum	1360	7	0
The ſeventh Year's Rent	200	0	0
The Intereſt of 1360 *l.* 7 *s.* one Year.	68	0	3½
Sum	1628	7	3½
The eighth Year's Rent	200	0	0
The Intereſt of 1628 *l.* 7 *s.*	81	8	4
Sum	1909	15	7½
The ninth Year's Rent	200	0	0
The Intereſt of 1909 *l.* 15 *s.* one Year	95	9	9
Sum	2205	5	4½
The tenth Year's Rent	200	0	0
The Intereſt of 2205 *l.* 5 *s.* one Year	110	5	3
Sum	2515	10	7½
The Eleventh Year's Rent	200	0	0
The Intereſt of 2515 *l.* 10 *s.* 7 *d.* one Year	125	15	5½
Sum	2841	6	2½

The

	l.	*s.*	*d.*
Brought over	2841	6	2½
The twelfth Year's Rent	200	0	0
The Intereſt of 2841 *l.* 6 *s.* one Year	142	1	2¼
Sum	3183	7	5¼
The thirteenth Year's Rent	200	0	0
The Intereſt of 3183 *l.* 7 *s.* one Year	159	3	2¾
Sum	3542	10	8½
The fourteenth Year's Rent	200	0	0
The Intereſt of 3542 *l.* 10 *s.* one Year	177	2	6
Sum	3919	13	2½
The fifteenth Year's Rent	200	0	0
The Intereſt of 3919 *l.* 13 *s.* one Year	195	19	7½
Sum	4315	12	10
The ſixteenth Year's Rent	200	0	0
The Intereſt of 4315 *l.* 12 *s.* one Year	215	15	7
Sum	4731	7	2
The ſeventeenth Year's Rent	200	0	0
The Intereſt of 4731 *l.* 7 *s.* one Year	236	11	4
Sum	5167	18	9

	l.	*s.*	*d.*
Brought over	5167	18	9
The eighteenth Year's Rent	200	0	0
The Intereſt of 5167 *l.* 18 *s.* one Year	258	7	10
Sum	5626	6	7
The nineteenth Year's Rent	200	0	0
The Intereſt of 5626 *l.* 6 *s.* one Year	281	6	0
Sum	6107	12	7
The twentieth Year's Rent	200	0	0
The Intereſt of 6107 *l.* 12 *s.*	305	7	0
Sum	6612	19	7

HENCE it appears that 200 *l. per Annum*, with its compound Intereſt, will, in twelve Years Time, amount to ſix thouſand, ſix hundred and twelve Pounds, nineteen Shillings and ſeven Pence. Now let us calculate the Advantages that will amount from one thouſand Acres of Oaks, planted at 40 Feet Diſtance, as aforeſaid.

IT was before ſhewn, that one Acre contain'd 27 Oaks.

THEREFORE multiply 27 the Oaks on one Acre by 1000 the Number of Acres propoſed. ——

THE Product is 27000 Trees, which, in 20 Years Growth, will be worth, at

at leaſt, 10 *s. per* Tree; ſo that the whole Plantation will be worth, to the Eſtate, 13500 Pounds excluſive of the Underwood or Paſture, which will in that Time be produced.

We may by this Computation, and the following Account, diſcover how eaſily we may improve our Lands, at a very ſmall Expence, to the great Advantage of the Nation in general.

The Expences of making ſuch Plantations have not, as yet, been ſtated by any. Our modern Authors direct, that Ditches, to encloſe ſuch Plantations, ſhould be ſix Feet wide; whereas, the cuſtomary Width is but four Feet, from the firſt Cheſt or Row of Quick-ſet or Heithorns, with one Foot only beyond the Edge of the Ditch, for the Workman to lay his Bill and Gloves on. This Breadth is what moſt People uſe between Neighbour and Neighbour, and what has the deſired End of a Ditch; nor do we plant our Quick-ſets treble, as they direct; for when they are ſo very thick planted, they not only ſtarve one another, but the middle Row being encloſed on each Side with the outer ones, has not a free Perſpiration, and therefore never makes ſo

good a Fence, nor ſo ſoon, as when we plant two Rows only. Beſides, the Rates of Quick-ſets, that they make Mention of, at two Shillings *per* Hundred, is a much greater Price than I ever knew to be paid for them, out of a Nurſery, where they are uſually ſold for Sixpence *per* Hundred, and very often much leſs. And again, as to Labouring Mens Wages, at one Shilling *per Diem*, performing about nine Feet in length, in cutting Stakes and Buſhes, and making about five Rod of dry Hedge; there's no Certainty in it; for ſome will do more in one Day, than others will do in a Week: And 'tis therefore in my humble Opinion, that if one of the moſt indifferent deſerves one Shilling *per* Day, that Man, that can and does perform, four or five Times the Labour of the other, ought to have his Wages as often doubled.

The Computations that modern Authors have made, of digging and ploughing Lands for ſowing Acorns, are contrary to what I ever found in Practice. Thoſe Lands that they make Mention of, that are full of Buſhes, Whinns, *&c.* if grubbed and digged only, may here, within ten Miles of *London*, where Mens Wages are the greateſt,

eſt, be performed for four Pence *per* Rod; and in Countries, more remote, where Wages are cheaper, at two or three Pence, inſtead of Sixpence *per* Rod; as by them computed.

AND where Lands are capable of being made fit for the Reception of Acorns, *&c.* by Ploughing, it may be perform'd at a much cheaper rate than twelve Shillings *per* Acre, for every Time of Plowing, as rated in their Computations.

BUT as I have had the Experience of both theſe Caſes, in all ſorts of Lands, I always found ſuch Lands that were very full of Roots, to be unfit for the Reception of Seeds, when they were only digg'd; and therefore, when ſuch Lands will allow of being trenched two Spit and the Crumb in Depth, 'tis always to be preferr'd before digging; which Trenching may be perform'd for Sixpence or Eight-pence the Rod, according to the more or leſs Roots therein, and Nature of the Land in working; for a ſtiff and ſtrong Land deſerves a Price one third more than a light Loam or Sand.

THIS Work ſhould always be performed early in *October* or *November*, when the bottom Spit ſhould be laid in Ridges, (in-

ſtead of being levell'd, and laid ſmooth, as is uſual) for the Winter's Froſts and Rains to mellow and make fit for the Reception of Seeds; and in the Spring to be levell'd down at the Time of ſowing.

But when Lands are freſh and clean, and can be plow'd, there may be much Money ſaved thereby. The Rate of ploughing an Acre, according to Mr. *Bradley*'s, and other Authors Computations, is twelve Shillings; yet whether they mean once, twice, or three Times ploughing the Acre, they make no mention; but the Truth thereof is as following, *viz.* The cuſtomary Price of ploughing Lands, about *Twickenham, Iſleworth, Brentford, &c.* is eight Shillings *per Diem*, for a Team of four Horſes, whoſe ſtated Day's Work, if in green-ſward Ground, (that has lain Paſture for many Years) one Acre; but in arable, or garden Ground, that is annually till'd, one Acre and half.

Those Lands that are intended for Plantations of Wood, ſhould be ploughed three Times before the Seeds are ſown, *viz.* about Midſummer, at Michaelmas and in Spring, juſt before planting; at which ſeveral Times, the Furrows of the ſecond

and

and third ploughing ſhould interſect the preceding; that is, if the firſt ploughing was perform'd the Length-ways of the Ground, the ſecond ſhould be the Breadth-ways, and the laſt the ſame as the former.

THESE contrary ways of ploughing, at thoſe ſeveral Seaſons, do thoroughly work the Land, and prepare it fit for Uſe, provided that 'tis ploughed about ten Inches, or a Foot deep, every Ploughing. When Lands are thus ploughed in ſmall Furrows, one Acre is a good Day's Work, ſo that from this 'tis evident, that one Acre, well prepared, as aforeſaid, will amount to one Pound and four Shillings, at the Rates aforeſaid; but farther from *London*, where Labour is cheap, it may be performed, perhaps, for twelve Shillings *per* Acre, thrice ploughed, according to the Computations of ſome Authors, that have lately wrote thereon, by hearſay only.

THE Miſcalculations made by theſe and ſuch Authors, does many Times make Gentlemen believe, when the Expences amount to more than they are told they will; that their Servants Negligence is the Cauſe thereof; taking for granted, that what an Author writes, is what he has proved

proved by Experience, which very rarely happens, if he was not bred a Gardener, and continually practising therein.

But however, the real Charges of these Works are very inconsiderable, to the great Advantages that are daily arising from them; and therefore, I am in hopes, that Gentlemen will, with the utmost Expedition, make large Plantations of all such kinds of Timber which are most agreeable to the Nature of their several Lands, and advantageous to their Countries.

And as I am now enter'd into the young Seminary, or Plantation, I will, before I proceed any farther, explain the manner of raising Heithorns, Crab-stocks, Furzes, &c. for the enclosing of our young Plantations, and the real Expences thereof, as paid for at *Twickenham*, *Isleworth*, *Brentford*, &c. where Day Labourers are paid one Shilling and Six-pence *per Diem*, for such Works, and then afterwards lay down an accurate Account, of the Expences in the first twenty Years Growth, and the real Advantages that arise therefrom in that Time.

CHAP. II.

Of the Manner of raiſing Heithorns, Crab-ſtocks, *and* Furzes, *for incloſing of Woods, Coppices, Paſtures, Corn-lands, Gardens,* &c. *and the great Advantages that ariſe from Plantations of* OAKS.

THE beſt Plants, for Fences againſt Cattle, *&c.* are the Heithorn, commonly called Quickſet, or Haw-thorn, the Crab-ſtock, and the Furze-buſh.

QUICKSETS or *Heithorns* are raiſed from their *Heis* or *Haws*, gather'd at the Fall of the Leaf, in *October* or *November*, and then ſown in Beds of light Loam; or they may be preſerved in Sand from the Time of their gathering, until the *February* after, and then ſown as aforeſaid; but they will not come up until the next Spring.

N. B. THAT when Heithorn Berries are gather'd, and laid in a Heap together, without Sand, *&c.* until the ſecond Spring after gathering; they very often heat and ſpoil one another; and therefore, tho' ſome may grow, being ſo kept, as mention'd by Mr. *Edward Lawrence*, in his Duty of a Stew-

ard

ard to his Lord, *pag.* 47. yet, 'tis by no means to be practiſed, ſince we are ſure that Sand will preſerve them, and the trouble therein very inconſiderable.

CRAB-STOCKS are raiſed from their Kernels, ſown in Seed-beds, as the Heithorns, and come up the firſt Year.

FURZES are raiſed from Seed, and are beſt when ſown, where they are to remain; for when they are tranſplanted, they do not thrive ſo well.

THESE two laſt are ſown in the Spring, about the middle of *February*, and make an extraordinary Fence very ſoon.

THE Heithorn and Crab Seedlings ſhould remain in the Seed-beds, before they are planted out for Fences three Years, for in that Time they will be greatly advanced in their Growth; but if they are tranſplanted from the Seed-bed, the ſecond Year into a ſmall Nurſery, in Rows, about ſix or eight Inches apart, keeping them clean from Weeds; by the next Seaſon of planting, they will be finely rooted, largely grown, and more certain of Succeſs: For 'tis a great Miſtake to plant Sets that are very ſmall.

THE

THE Furze delight in light Lands, the Heithorn in loamy Lands, either light, midling, or ſtrong, and the Crab, in ſtrong Lands and Clay.

THE Diſtances that they ſhould be planted at in the Rows, muſt not be leſs than ten Inches or one Foot, nor the Number of Rows more than two, for the Reaſons before obſerved on their free Perſpirations.

THE Rows ſhould be about one Foot diſtance from each other, wherein the Plants of the upper Row ſhould be planted againſt the intermediate Spaces of the lower. And the firſt or lowermoſt Row ſhould be planted; exactly level with the Surface for 'tis from the lowermoſt Row, that the Breadth of Ditches are accounted.

THE uſual Method of planting *Heithorns* and *Crabs* is to place the firſt Row upon the bare Surface, and thereon lay the Earth, that comes out of the Ditch to raiſe the Bank, without firſt digging the Surface, whereon the firſt Row of Plants are placed; but tho' this Practice does do well, where the Land is good, yet I cannot but recommend the digging of the Surface, one ſingle Spit, before we place our Sets thereon. For 'tis unqueſtionable, that the Earth thus

thus broken up, is more natural for their tender Fibres to ſtrike in, than when laid upon an undiſturbed hard Surface of Graſs, *&c.* that for a long Time reſiſts their free Acceſs therein.

When the firſt Row of Sets are thus placed, then we proceed to the raiſing of the Bank, with the Earth out of the Ditch, until 'tis raiſed one Foot perpendicular; at which Time it being made nearly level, the laſt Row is placed as aforeſaid; after which the remaining Earth in the Ditch is laid thereon.

The Ditch being thus dug, and the young Sets planted, we place a dead Hedge upon the upper Part of the Bank, for a Fence, until the young planted Sets ſpring up; which if kept clear from Weeds, will in three or four Years, make an impenetrable Fence againſt Cattle in general.

If Lands are not very light and dry, or very cold and wet, 'twill be beſt to plant the firſt and lowermoſt Row with Crabs, and the uppermoſt with Heithorn, which together make the beſt of Fences; which, as they advance, ſhould once a Year be clipt with Shears, as well at their Heads,

as

as Sides; which will cauſe them in the ſucceeding Year to thicken very much.

YOUNG Sets thus planted and order'd, will in three or four Years, make very ſubſtantial Fences againſt all Kinds of Cattle, Swine, *&c.* and endure for many Years.

BUT by the Way, I ſhould have took Notice that at the Time of planting Encloſures, we ſhould not forget to place at equal Diſtances, in the upper Row of Quickſets, at about forty Foot Diſtance, three or four Acrons, or inſtead thereof, one thriving ſeedling Oak, of three or four Years Growth, or at ten, fifteen or twenty Feet diſtance, young Layers, or other Plants of *Engliſh* Elms, that are about two or three Years Growth, which in Time will not only become an Ornament, and Grace to the Encloſures, but make good Shelter for Cattle, and Timber alſo, to their great Improvement. Which Plants ſhould every Year be carefully disbudded of their lateral Buds, as they appear, and preſerved from the Shears, at the Time of clipping the Thorns.

THE cuſtomary Price paid for Encloſures, thus planted with Ditches, four Feet wide

at

at their Tops, one at their Bottoms, and three Feet deep, is one Shilling *per* Rod, and find the young Sets into the Bargain; but when the Plants are provided ready to the Workman's Hand, the uſual Price is, eight or nine Pence *per* Rod.

The Price of the Workmanſhip of Hedging, Ditching, and planting two Rows of Quickſets, at three Pence *per* Rod, as mention'd by Mr. *Lawrence, pag.* 163, is leſs than half the Price, paid about *Twickenham, Iſleworth, Brentford, &c.* But in more remote Parts, 'tis poſſible that poor Mens Labour may be at that very low and mean Rate; but I muſt beg leave to take Notice, that the Quantity of Quickſets, recommended by him to be planted in a Rod running Meaſure, are abundantly too many; for if one Rod is allowed to be 21 Feet, and 'tis planted double, with 150 Plants, their Diſtances will be but 3 $\frac{1}{7}$ Inches, which is full 6 Inches too little; for when Heithorns, or indeed any other Vegetables, are planted too thick, they not only rob or ſtarve each other of the neceſſary Juices, but for want of Air, cannot perſpire freely, and thereby their Growths are hinder'd.

N. B.

N. B. As to Fences for Lands which are very wet, 'tis beſt to raiſe up very high Banks by larger Ditches, and on the Surfaces plant the Heithorns or Crab-Stocks as before directed.

It is cuſtomary in many Parts of *England*, to graft (at twenty or thirty Foot diſtance) ſome of the thriving Crabs with Cyder Apples, from whence they often receive great Plenty.

When our Hedges of Heithorns and Crabs have ſeen five or ſix Years, they ſhould be plaſh'd by a skilful Workman, which cauſes them to grow very thick. This Work ſhould be done in *September*, *October*, or *November*: As alſo the firſt planting of Sets for Fences.

I need not give myſelf the Trouble of directing or ſhewing the Country Labourer and Hedger, by Words, or Copper-plates, how that Operation of Hedges is to be performed; ſince I am aſſured, that great Numbers of them underſtand it much better than any Author, that has hitherto wrote thereon, can direct them.

When plaſhed Hedges of this Nature are by Time worn thin, and their Branches become very large; then we muſt cut them

entirely down, cloſe to the Surface of the Bank, leaving ſome of the ſmall Wood to form a Fence above; whilſt the old Stumps puſh out freſh Shoots, which, in two or three Years, will make a very good Fence again, being order'd as when firſt planted.

In the making of Ditches, care ſhould be taken to make the Banks with ſuch an eaſy Reclination, as to ſtand without calving, or colting down, by the Winter's Rains and Froſts; and ſteep enough to prevent Swine or Cattle from eaſily aſcending the ſame.

When we make Fences of the Furze, we ſhould make uſe of the *French* Kind, which riſes much higher than our *Engliſh* Kind. Furze muſt be ſown in ſhallow Drills, upon the Summit of the Banks, very thinly, at one Foot diſtance, each Drill from the other.

Two Drills on a Bank are ſufficient, and when the young Seedlings come above Ground, they ſhould be kept clear from Weeds, and ſingled out to about one Foot diſtance in the Rows.

Every *Autumn*, they ſhould be clipped, which cauſes them to thicken very much, and gives a pleaſant Aſpect.

I cannot help recommending the planting of theſe Sorts of Hedges, in our Wilderneſſes, and other Parts of the Garden; for during the Seaſon that they are in Bloſſom, which is a long Time, there's no Plant makes a finer Appearance. And beſides, they are an admirable Covert for Game, as well as to draw plenty of Birds, (ſuch as Linnets, Bullfinches, *&c.*) which build their Neſts therein.

The black Thorn, or Slow-buſh, does alſo make a good Fence, when mix'd with Crabs, or Heithorns; but the Stones thereof lie two Years in the Ground before they ſpring up. The Manner of planting Fences herewith is the ſame, as in the Heithorn and Crab-ſtocks.

Young *Engliſh* Elms, being planted in double Rows, at two Feet apart, and plaſhed by a skilful Hand; after three or four Years Growth, make an excellent Fence, being kept clipt; and there's no Plant makes a more beautiful Hedge in the Garden, when skilfully order'd. Of which hereafter, in its Place.

Thus have I given an exact Account, of the Manner of raiſing, planting and ordering Fences, for the Preſervation of young

Plantations, as well as Corn, Paſtures, *&c.* after the beſt Manner; the Neceſſity whereof has been long Time known. For *Virg.* in *Geo.* 2. thus adviſes,

Texendæ ſepes etiam, & pecus omne tenendum eſt:
Præcipue, dum frons tenera, imprudenſque laborum;
Cui, ſuper indignas hyemes, Solemque potentem,
Sylveſtres uri aſſiduè, capreæque ſequaces
Illudunt: paſcuntur Oves, avidæque juvencæ.
Frigora nec tantum cana concreta pruina,
Aut gravis incumbens ſcopulis arentibus æſtas,
Quantum illi nocuere greges, durique venenum
Dentis, & admorſo ſignata in ſtirpe cicatrix.

Georg. 2. 371.

Plaſh Fences, thy Plantation, round about,
And whilſt yet young, be ſure keep Cattle out;
Severeſt Winters, ſcorching Sun infeſt,
And Sheep, Goats, Bullocks, all young Plants moleſt:
Yet neither Cold, nor the hoar rigid Froſt,
Nor Heat, reflecting from the rocky Coaſt,
Like Cattle, Trees and tender Shoots confound,
When, with envenom'd Teeth, the Twigs they wound.

I had almoſt forgot the plain or green Holly, that makes an admirable good Fence (but ſlowly) in very dry and poor Lands, where the others will not grow; ſo alſo doth

doth Alder and Willow, in Lands that are very wet and cold.

N. B. THOSE Timber Trees, which I adviſed to be planted in the young Hedges of Heithorn, *&c.* muſt be kept yearly, or every two Years, dreſs'd, and pruned up cloſe to their Bodies; whereby they will not only permit the Thorns to thrive under them, much better than when ſhaded and dript, but become Timber many Years ſooner, free from Knots, *&c.* which makes them the more valuable for many Uſes.

CHAP. III.

Of the real Expences, incident to the preceding Plantations of OAK, *and the great Advantages that ariſe to Eſtates therefrom.*

I Will ſuppoſe, that the Works were to be performed within ten Miles of *London*, where Workmens Wages are at the higheſt Rate of any in *England*. It has been proved, that in one Acre of Land, there may be planted 27 Oaks, which require as many Holes to be dug, of three

Feet Diameter and Depth; the Quantity of Earth to be taken out of each is, 21 $\frac{1}{14}$ cubical Feet. A cubical Yard is 27 cubical Feet, which, in Gardening, is accounted a Load, and the cuſtomary Price, *per* Load, for ſuch Digging, is four Pence; ſo that each Hole is worth two Pence half Penny, and $\frac{1}{3}$ of a half Penny.

See the Calculation.

The Diameter of one Hole 3 Feet
Multiply'd by 3

The Product is 9 the Diameter ſquared
Which multiply'd by 11, produces 99,

And divided by 14) 99 (7. $\frac{1}{14}$ gives the Area of one Hole
98

1. Remains.

This Area being multiplied by the Depth of the Hole, 3 gives 21. $\frac{1}{14}$ the Solidity of the Earth in each Hole

The

The Area 27. $\frac{3}{14}$
The Depth 3

The quantity of Earth in one Hole } 21. $\frac{9}{14}$ cubical Feet
Which multiply by the Number of holes in an Acre: } 27

147
42
17. $\frac{5}{14}$

The ſolid Feet contained in an Acre's Holes } 584. $\frac{5}{14}$

Now divide 584, by 27, the ſolid Feet in one Load, and the Quotient is the Number of Loads in an Acre.

27) 584 (21 $\frac{17}{27}$ Loads required.
54.

17. remains, which is ſomething leſs than $\frac{2}{3}$ of a Load. Now 21 $\frac{2}{3}$ Loads at 4*d per* Load, is 7*s*. 2 *d*. $\frac{1}{2}$ the whole Expence of digging the Holes in one Acre.

If 7*s*. 2*d*. $\frac{1}{2}$ is multiply'd by one thouſand, the Quantity of Acres, the Product is the whole Expence of Digging.

See the Calculation.

FIRST, 7000 Shillings is 350 Pounds

The Quantity of Acres 1000
multiplied by the Shill. 7 the Product is 7000 Shillings.
Which divide by 20) 7000 (350 *l.*

SECONDLY, a thouſand two Pences is eight Pounds, ſix Shillings, and eight Pence.

The Quantity of Acres 1000
Multiply'd by 2 Pence, the Product is 2000 *d.*
Which divide by 12 the Pence in a Shilling. } 12) 2000 (166
12
80
72
80
72
8

Now divide 166 Shillings by the Shillings in a Pound. } Shill. 20) 166 (8
160
6

Remains, equal to *s.*, or ſix Shillings.

THIRD-

THIRDLY, a thouſand Half-pence, is equal to 500 *d.* equal to two Pounds, one Shilling and eight Pence, and the whole Expence of Digging, is as follows.

	l.	*s.*	*d.*
Seven thouſand Shillings	350	00	00
One thouſand Two-pences	008	16	08
One thouſand Half-pence	002	01	04
Sum Total	360	18	00

THE next Expence is, filling the Holes in the Spring, and planting the Acorns, which may juſtly be ſet at half the preceding Expence. Then will the ſecond and laſt Expence at planting be 180 *l.* 9 *s.* *d.*

To which add the Expence preceding	360.	18.	0.
And the Total Expence of planting one thouſand Acres of Oaks, is	541.	07.	0.

NOW let's compute the annual Expence of keeping them houghed clean of Weeds, and digging about them early in the Winter, to let in the Winter's Rains.

IT

IT has been already proved, that the Surface of one Hole is 7 $\frac{1}{14}$ ſquare Feet. Therefore multiply the Number of Holes, 27000

By the Area of one, 7. $\frac{1}{14}$

189000
1928, $\frac{8}{14}$

And the Product is 190928. $\frac{8}{14}$ Feet.

Now 272$\frac{1}{4}$ ſquare Feet being one ſquare Pole, therefore divide 190928 $\frac{8}{14}$ by 272, $\frac{1}{4}$. But for the more eaſy working, we'll leave the Fractions out.

Quotient.

272) 190928 (701 ſquare Rods
1904

528
272

256 remains, which is very near one Rod; ſo that we may compute the whole at 702 Rods.

Now 160 ſquare Rods, being one Acre, therefore divide 702 by 160.

160) 702 (4 { Quotient, the Acres contain'd therein.
640

62 remains, which are Rods, and

and ſomething more than $\frac{1}{4}$ of an Acre; but we'll ſet it at 5 Acres.

THE Quantity being thus obtained, the annual Expence may be eaſily accounted for, as follows.

Firſt, THE houghing and ſtirring the Earth about them moderately deep with the Hough, in the Summer, may be very well performed for Ten Shillings *per* Acre, once doing; and the digging about them one ſingle Spit deep, at the beginning of the Winter, at forty Shillings *per* Acre, which is three Pence *per* Rod.

	l.	*s.*	*d.*
THE ſeveral Holes ſhou'd be houghed four times in the Summer, the Expence whereof is,	12	10	00
To which add the digging 5 Acres, at 2 *l. per* Acre	10	00	00
And the total Charge of keeping one thouſand Acres, *per Annum*, will be	22	10	00

OUR uſual Price to Day-Labourers, is nine Shillings *per* Week, which is twenty three Pounds, eight Shillings *per Annum*, and but eighteen Shillings more than the preced-

preceding Account: So it appears, very plainly, that one Man can very well govern and manage one thouſand Acres of Oaks, ſo planted; and the greateſt annual Expence, but twenty three Pounds at moſt. Now the whole Charge, (the Fencing excepted, which has been already accounted for) is as follows.

	l.	*s.*	*d.*
For digging and planting 27000 Holes of Acorns	541	07	00
The ſimple Intereſt thereof, for twenty Years	541	07	00
The compound Intereſt extraordinary	250	00	00
For twenty Years keeping, at 23 *l.* 8 *s. per Annum*	468	00	00
The ſimple and compound Intereſt thereof paid yearly for twenty Years	302	06	00
Sum	2103	00	00

WHICH is the Expence of planting and keeping 1000 Acres for twenty Years.

IT was before ſhewn, that the Rent of 1000 Acres at 5 *s. per* Acre, with the ſimple and compound Intereſt, is 6612 19 07

To which add the above 2103 00 00

And the whole Expence is, 8715 19 07

BUT

BUT 'tis to be noted, that the Value of the under Crops are not accounted for, to prove the great Advantages excluſive thereof.

Now, every Tree, in twenty Years Time, is, at the very leaſt, worth ten Shillings each, and conſequently, the whole 27000, will be worth 13500 Pounds.

From which ſubſtract the Expences preceding, 8715 Pounds,

and the next profit, in twenty Years, will be 4785 Pounds.

BUT as I ſaid before, the Lands may be annually employed for Paſture, Corn, *&c.* as uſually, whereby the annual Rent of two hundred Pounds, and its Intereſt, may in great part, or wholly, be preſerved; ſo that the real Advantage of a Plantation of one thouſand Acres of Oaks, will be, at the leaſt, ten thouſand Pounds, in the firſt twenty Years Growth: And if their lateral Buds have been carefully diſplaced, as they appear'd, they will have no farther need of houghing and digging about their Roots as before; ſo that for the next twenty Years after, there will be no Expence in their keeping; at the end of which Time, they will have more than doubled their Value, and

and be worth upwards of 20000 Pounds, excluſive of their Bark and Lop.

Mr. *Evelyn*, in his diſcourſe on Foreſt Trees, *Page* 53. ſpeaking of Wallnut Trees, ſays, That in ſeveral Places, between *Hanaw* and *Frankfort*, in *Germany*, no young Farmer, whatſoever, is permitted to marry a Wife, till he brings Proof, that he hath planted, and is a Father of ſuch a ſtated Number of Wallnut Trees; and the Law is inviolably obſerved to this Day, for the extraordinary Benefit which this Tree affords the Inhabitants: And 'tis hoped, that our wiſe Legiſlators will provide ſome ſuch Law, for the planting and improving Timber Trees in general, throughout the whole Kingdom. I will not aſſign what Laws ſhould be made for this purpoſe, but I wiſh they were ſuch, that if the Heir of every Eſtate did not, within five Years after Poſſeſſion, cauſe all his Meadow, and other Lands (thoſe for Corn excepted) to be planted with Oaks, and other proper Timber Trees, at fit Diſtances, and his Hedge-rows alſo, he ſhould forfeit every Acre then found unplanted; which Trees he ſhould be obliged to preſerve from Cattle, until grown out of their Powers to injure, by crop-

cropping, &c. and not to be fell'd under thirty five or forty Years Growth, unleſs for Repairs of the Premiſſes, as for Gates, Stiles, Poſts, &c. on Forfeiture of twenty Pounds to the King, for every Tree cut down before that Age: But all this I ſubmit to the Conſideration of the Senate.

THUS have I given an Account of the real Advantages that will ariſe from Plantations of Oaks, when made within ten Miles of *London*; therefore, where poor Mens Labour is much cheaper than there, the Expence will be much leſſer, and conſequently the Advantages greater.

N. B. That the young planted Oaks muſt be preſerved from the cropping of Sheep, Goats, Cows, &c. by Hurdles, or Stakes, interwoven with Buſhes, as a ſmall ſtak'd Hedge, well known to every Husband-man, and therefore needleſs to be mention'd here.

CHAP.

CHAP. IV.

On the Perſpiration of the ſeveral Kinds of Elms, *their Manner of raiſing and ordering for Timber in Woods, Parks, Foreſts, Coppices, Hedge-rows,* &c. *And the Advantages that ariſe from ſuch Plantations.*

THE ſeveral Kinds of Elms in *England* are three, *viz.* The Mountain Elm, vulgarly called the *Engliſh* Elm, the *Dutch* Elm, and the *French* Elm, call'd vulgarly the witch Elm; of which, the Mountain or *Engliſh* Elm is beſt for Timber, and the others to plant in Gardens for Hedges, Avenues, Walks, *&c.* and to thicken the Quarters of Wilderneſſes for covert to Game. And indeed the Mountain, or *Engliſh* Elm, is of great Uſe and Ornament in the Garden alſo, for the ſame Uſes as the others preceding; and if I may be permitted to ſpeak my real Opinion thereof, I can't ſay, but that it makes as beautiful an Appearance, as any Tree whatever, and more eſpecially when Hedges, Groves, Walks, Avenues, *&c.* are planted therewith; for its Leaves

are not only very beautiful in their Forms and Magnitudes, but of a pleaſant Green, and one of the very laſt that falls in the Autumn; but the different Nature of Soils does alter this laſt very much, for light and warm Lands will puſh out their Leaves in the Spring much ſooner than ſtiff and cold Lands; but then they have this Evil attending them, they drop ſomething ſooner in the Autumn.

THESE ſeveral Kinds of Elms are increas'd by Layers, or Suckers, and ſome ſay by Seed alſo; but I never made the Experiment. Mr. *Evelyn*, in his *Sylva*, or Diſcourſe on Foreſt Trees, ſays they will, eſpecially the *French* Elm, which, he ſays, comes well from the *Samera* or Seed. So doth our curious Botaniſt Mr. *Bradley* ſay the ſame, in the firſt Part of his new Improvements, *Page* 44. " It may be propagated from the Seed or *Samera*.

I muſt confeſs, that no two Men did ever agree better in their Opinions, than theſe two Gentlemen do in their Writings, for if we trace them throughout, there's very little Difference to be found between them, their Language excepted.

BUT however, they ſay, we may raiſe Elms from their Seeds, which ripen and fall in *April*, or the Beginning of *May*, being ſown in fine ſifted Earth, in a ſhady Expoſition, and water'd from Time to Time, as the Earth grows dry; but the common and moſt expeditious Ways, that we propagate them, is by Suckers or Layers.

THE Suckers are got out of Hedge-rows, Woods, *&c.* ſoon after *Michaelmas*, when the Seaſon will permit them to be drawn, or (much better) taken up with a Spade.

THE beſt Kinds of Soils, out of which we ſhould draw our Suckers, are thoſe that are light, ſuch as ſandy Loams, or moderate Sands. When we gather Suckers of Elm, we ſhould obſerve to dig them up with a Spade, without drawing, if poſſible; (for if by drawing their Roots, they are ſtrained, they will not grow) to carefully preſerve them in a Sack from the Wind and drying Air, to immediately plant them after taking up, being firſt pruned with a very ſharp Knife, that cuts clean, and that all the bruiſed Parts of their Roots be carefully pruned away.

THAT their Roots are preſerv'd in as great Quantity as poſſible, provided they are

are ſound, and free from Bruiſes, *&c.* And that their Heads be reduc'd within two or three Buds, which generally is about three or four Inches clear off the Roots.

When they are well rooted, then they may be planted in Rows about one Foot apart, and two Feet aſunder. Yet if they are but indifferently rooted, then plant them in Beds, at about five or ſix Inches apart, where they ſhould remain to get well rooted, at leaſt two Years. In the Spring, when they are ſhooting out the ſeveral Branches from their Buds, we ſhould make Choice of the ſtrongeſt of each, and diſplace all the others, by pruning or rubbing them off. But this Work muſt not be done, until the Branches to be preſerv'd are about ſix or ſeven Inches in Length, and capable of drawing Nouriſhment from their Roots, as well, as to perſpire away the crude Part thereof, as 'tis drawn from their Roots.

By this Means, the firſt Year's Growth will be equal to thoſe of three or four, that has had all their Branches ſuffer'd to grow together.

For without Diſpute, the Roots of any Vegetable can ſupport one ſingle Branch

much ſtronger, than when there are three or four to be ſupported with the ſame Nouriſhment.

WHEN the firſt Year's Growth is over, we ſhould determine the Quantity intended for Standards, that is, Timber Trees, to tranſplant out in Avenues, Walks, Parks, Hedge-rows, *&c.* And thoſe for Hedge-Plants in Wilderneſſes, Walks, *&c.* Thoſe deſign'd to make Timber Trees muſt in the ſecond Spring have their lateral Buds carefully diſplac'd, ſome few excepted near the Top, as directed for the Oaks: But thoſe for Eſpalier, or Hedge-Plants, muſt have their forward Buds only diſplaced, leaving thoſe that are in the Line of the Rows, to break out into Branches, to form an Eſpalier; and it will not be improper, if in the middle of *May* we nip or pinch off the extream leading Buds of their lateral Shoots, which will occaſion thoſe Branches to throw out others, that will cauſe the young Plants to be well thicken'd at their Bottoms.

WHEN our Trees have been thus order'd, the ſecond Year we ſhould tranſplant them into our Nurſery, if our Places, intended for them to grow in for good and all, are not ready,

ready, as directed in my new Principles of Gardening, *Page* 118: But if our Lands are ready, where they are to remain, 'tis much the better and ſurer Way, to plant them at their next Removal, which ſhould be in *October* or *November*, of the ſecond Year, where they ſhould have the ſame Management as before directed.

WHEN we would raiſe Elms by Layers, we ſhould provide a Piece of good mellow freſh Land, which, to produce good Layers, ſhould be well dunged the Year before we begin to uſe it for this Purpoſe. Then being provided with a ſufficient Number of well rooted Plants well grown, the larger the better, we ſhould trench out Ground in *October*, and therein plant our Trees, at eight or ten Feet diſtance from one another, their Heads being cut off within eight Inches of the Ground; and in the planting of them, we ſhould be ſure to place the Stools or Plants of the ſecond Row againſt the intermediate Spaces of the firſt; for thereby, they will have a much more open Air, than when planted directly oppoſite to each other.

EACH Plant (which Gardeners call Stools, when thus planted for theſe Purpoſes) will

produce ten, fifteen, or twenty Layers, and ſometimes thirty, when very large, which are to be laid down in *November* or *February*; and by *October* following will be well rooted, fit to tranſplant, either into the Nurſery or Hedge-rows.

In the Performance of this Work, Care ſhould be taken, not to place the Layers too near one another, ſo as to hinder each other's free Perſpirations, whereby many, for want of a free Air circulating about them, either periſh entirely, or being ſaturate with Sap, cannot draw up more, and thereby are render'd incapable of drawing Roots. For the Manner of performing this Work, I refer you to my new Principles of Gardening, *Page* 117.

When your Layers have taken Root, which they'll have done by the Beginning of the ſucceeding Winter, we ſhould cut them from the Mother-Plant, and with a Spade lift them out of the Ground; and having carefully pruned their Roots, head them down to about five or ſix Inches, and plant them in the Nurſery, as directed in the following Page of my new Principles 118, where they are to remain as directed for thoſe raiſed from Suckers; in the following

lowing Springs, their lateral Buds are to be diſplaced, as before directed, accordingly as you intended them, either for Eſpalier or Hedge-Plants, or ſtandard Trees for Timber, *&c.*

But if we are determin'd to purchaſe Trees from a Nurſery, being not willing to wait for their raiſing, we are to note, that the larger they are, the better, provided that they have not ſtood long in their Places, and are badly rooted; but have been tranſplanted every third or fourth Year, which furniſhes them with plenty of Roots. I have tranſplanted Elms forty Feet high, and ſixteen Inches Diameter, that have thrived very well, being well rooted; but as Trees of ſuch a Size are not always to be had, we muſt therefore content ourſelves with what the Country produces. The beſt Size is, thoſe that have handſome Heads, about ten or twelve Feet high, and four Inches Diameter at their Bottoms; which being planted carefully in *October*, and protected from the Injuries of Wind, Cattle, *&c.* by being well ſtaked, will ſoon become fine Trees, to the entire Satisfaction of their Proprietors.

THE Soil moſt natural to this Plant is, a freſh, moiſt, ſandy Loam, not but it will thrive very well in a Loam mix'd with Gravel, in chalky and flinty Lands that are moiſt, in moiſt rich Sands, and indeed any Soil; a cold wet Clay, and hot hungry Gravel, excepted.

THE proper Diſtances that the Plants ſhould be planted at, when they are planted to make Hedges, Walks, Avenues, *&c.* are about two Feet and a half, or three Feet apart, placing a ſmall one between two higher ones, to fill the Bottoms thereof. When we plant them as ſtandard Trees, to fill up the Quarters of a Wilderneſs, where we require a Thicket as ſoon as poſſible, then we plant them at ſeven or eight Feet apart, and the like Diſtance in Groves, to cauſe an immediate Shade; ſo alſo in Eſpaliers, before a Houſe, or on a Terrace Walk; but I cannot ſay that I approve of this very thick planting, if the Trees are not every third or fourth Year thin'd in their Heads, by skilful pruning, to let in a free Air, wherein they perſpire freely and expand much; by this pruning, I don't mean cutting them ſo very much as to deſtroy their Shade entirely, but to prevent their Branch-

es

es from too much ſhading one another, whereby they become naked of Leaves, for want of a free Perſpiration.

THE Standards of ſhady Walks ſhould be planted at a like Diſtance, but thoſe in Viſta's, Avenues, *&c.* may be at greater Diſtances, as thirty, thirty five or forty Feet, accordingly as the Magnitude of the Avenue, *&c.* requires.

WHEN we plant them on purpoſe for Timber, in the Park, Coppice, Hedge-rows, *&c.* we may place them abundantly thicker, at twelve, ſixteen, or twenty Feet apart, being kept disbudded every Spring, as before directed. 'Tis a Tree that is ſociable, (as Mr. *Evelyn* terms them) delighting to grow in Conſort, as well as ſingle, and even very cloſe, as to almoſt touch one another, and therefore we may plant them very thick in our Hedge-rows.

IF we would propagate this Tree in Soils that are very wet and cold, we ſhould firſt, in *October*, dig up the Surface of the Earth, where we intend to plant them in the manner of ſingle digging, each Place, where the Trees are to be placed, to be about ſix Feet Diameter,

THEN

THEN in *February* take up your Trees, which being pruned fit for planting; place them on the Surface, and raiſe the Earth about their Roots, (with freſh Earth brought to them) a ſufficient Depth, *viz.* ſomething more than they were when growing in the Nurſery, which being well cloſed to their Roots, and made good at that Height about ſix Feet round the Stem of the Tree, will undoubtedly proſper well. For the ſhallower we plant in wet and cold Lands, the better.

AND as this Manner of Planting is perform'd in the Spring, when 'tis often very dry, eſpecially in *March*; we ſhould, to ſave our ſelves what Expences we reaſonably may, and withal ſerviceable to our new planted Trees, lay ſome Litter, Dung, or Mowings of Graſs, about the Roots of each Tree, to preſerve the Moiſture from being too haſtily evaporated from them. But if the Land is very wet, then there will be no Occaſion for this Defence, but they will be rather better without it: For if by Covering we ſhould confine the over and above Moiſture from having a free Evaporation; 'tis probable that their Roots may become very ſoon ſaturated therewith, and then for want of the

the kindly Influence of the Sun, to exhale it away, will periſh. So that the defending of Moiſture from the Sun, in theſe Caſes is to be done diſcretionally, and not at all times in every Kind of Soil.

THIS lovely Tree, when planted as aforeſaid, ſhould be protected from the Inſults of Cattle, and Winds, by being ſecurely ſtak'd and buſh'd. Wherein we are to obſerve, that the common Method of defending Trees from Cattle, by three Oaken Stakes drove into the Ground about them triangular, and cloſed on their Sides at Top and Bottom with ſmall Rails, is oftentimes of more Prejudice to the Plant, than the Winds and Cattle are. For when Trees are thus encompaſs'd, the Carpenter being ignorant of the Matter, contracts them ſo very cloſe at the Top, that upon every Blaſt of Wind, the Tree is gauled againſt the upper Rails, whereby its Growth is greatly retarded, and Body rendered diſagreeable to the Eye; if it does not ſoon after totally periſh, which frequently happens.

OF all the Foreſt Trees growing in *England*, there's none ſo inoffenſive and agreeable to Cattle as the Elm, under whoſe Shade in the Heat of Summer they much delight;

delight; nor are its Roots of ſuch a ravenous Nature, as to wholly deprive Arable and Paſture Lands of their Nouriſhment, in all thoſe Parts where they extend; as the Aſh will do, whereby Corn and Graſs do ſoon periſh.

WHEN Avenues, or other Walks of this Tree are very old and decay'd at their Tops, 'tis beſt to lop off all their lateral Branches, or Arms, cloſe to their Bodies, and their decay'd Heads alſo, leaving nothing but the naked ſound Body. And that our Work may be the more graceful, we ſhould ſtrain a level Line along their Heads very tight, which will direct us how to head them level, which is much handſomer, than when ſome are higher than others. The beſt Seaſon for this Work is *February*, when the Heat of the Spring is advancing, and the Winter's Wet and Cold over, which their Wounds will imbibe freely, to their great Prejudice. But to prevent their receiving ſuch Injuries at their Wounds, I adviſe that a Salve of Bees-wax and Mutton-ſuet be prepared; with which let all their ſeveral Wounds be covered, to preſerve them from the Injuries thereof.

THE

THE common Method of lopping the Arms of Elm Trees, at a Foot or two Diſtance from their Body, is entirely wrong; for thoſe remaining Parts do imbibe and communicate Wet to their Bodies in much greater abundance, than when cut cloſe, as before directed.

OF this Error Mr. *Evelyn* takes Notice, in his *Sylva, pag.* 32, (where ſays he) "I "have noted many Elms ſo disbranched, "that the remaining Stubs grew immediate- "ly hollow, and were, as ſo many Con- "duits or Pipes, to hold and convey the "Rain, to the very Body and Heart of the Tree."

THE Seaſon for felling this Tree for Timber, is in *November, December,* and *January,* at which Time great Care ſhould be taken, to ſecurely cut their Kerfes before their Fall is made, leſt their But-ends are greatly injured thereby. And in Oaks, the ſame Care ſhould be taken, leſt the Butts are ſplit in their Fall, which frequently happens, to the great Loſs of the Proprietor. This I do not mention to an experienced *Woodman,* whoſe Judgment in disbranching the proper Parts of a Tree, and cutting its Kerfe cloſe to the Ground, is not to be doubt-

doubted: But to caution thoſe that are not ſo well acquainted therewith.

The great Uſes that this noble Tree is of, for the Rimbs and Floats of Water-wheels, for Engine-trees, Mud-ſills, and other Uſes in Mill and Water-works, as Pumps, Pipes, *&c.* for Wheel-wrights, Turners and Carvers uſes; beſides many others in civil, naval, and military Structures, are ſufficient Proofs of the great Benefit it is to the Publick; wherefore it ſhould undoubtedly be propagated in as great an abundance as poſſible.

The great Advantages that ariſe from Plantations of this Tree, has of late been fully declared, to the entire Satisfaction of thoſe that furniſhed the Timber for the Pipes lately laid in the Water-works of *Chelſea, York-buildings, New-river, Weſtminſter, Shadwell, Rotherith* and *Deptford*; in which laſt Work, I my ſelf, in one Year, laid upwards of one thouſand Loads bored into Pipes.

But excluding all theſe many Advantages that ariſe from the Timber, its beautiful Verdure, and delightful Shade, is Encouragement ſufficient for us to propagate it as much as poſſible. But obſerve here the

the ſweet Deſcription of this majeſtic Plant, and Advice for its Propagation, by *Rapin*.

Ut viror eſt ulmo lætus, ramique comantes,
Arduus, alta petens & levi cortice truncus,
Ulmum adhibe ordinibus, quoties fundenda per hortum.

Sunt ſerie ſpatia ingenti, texendaque totis,
Æſtivos contra ſoles umbracula campis:
Una alios inter texendis aptior ulmus
Marginibus ſpatiorum, exornandoque vireto.
Seque adeo ſeries, plano ſuper æquore, tendat
Ulmorum tractu longo; quantum ipſa tuentum
Lumina, vel greſſus valeant luſtrare ſequentum.

An Elm for graceful Verdure, buſhy bough,
A lofty Top, and a firm Rind allow.
Plant Elm in Borders on the graſſy Liſt,
Branches of Elm into thick Arbours twiſt;
A Gallery of Elm draw to the End
That Eyes can reach, or a breath'd Race extend.

Dutch Elms are raiſed as the preceding Mountain or *Engliſh* Elm, and are of a much quicker Growth, and therefore planted in Gardens for ſpeedy Shade; but they never make good Timber, nor very large Trees, that I ever ſaw. Their Barks are very tough, and nothing near ſo agreeable

to

to the Eye, as the preceding; nor are their Leaves ſo beautiful, being of a darker unpleaſanter green, and much larger.

BUT however, they are not deſpicable, for they cauſe an agreeable Variety, and Shade.

IT was propos'd ſome Time ago, by Mr. *Thomas Green*, Nurſery-man, at *Brentford-end*, *Middleſex*, to have obtain'd a Patent from his late moſt Gracious Majeſty King *George* I. for grafting and inoculating the *Engliſh* upon the *Dutch* Elm, which does greatly improve their Heads, for Walks, Eſpaliers, and other Uſes in the Garden; but for Timber, this Practice is deſtructive. For as I before obſerv'd, the *Dutch* Elm does never arrive to a large Stature, altho' 'tis of a quick Growth when young.

Virgil relates, that they will join with the Oak, (who undoubtedly made Experiments thereof) as alſo, upon one another.

THE learned Mr. *Evelyn* reports, that the grafting Elms is an Improvement to their Heads. Which Report of his being upwards of ſixty Years old, makes it appear that 'twas not a new Diſcovery of Mr. *Green*'s; for we may aſſure ourſelves, that

Mr. *Evelyn* would not have related it, had it been fabulous or Conjecture only. Beſides, it has been practiſed by many eminent Gardeners, for many Years paſt, and particularly in ſeveral Parts of *Yorkſhire*, and is ſtill to this Day. And nearer at Home, no farther off than *Kenſington*, I am inform'd, that Mr. *Furber*, an ingenious and well experienc'd Nurſery-man of that Place, has many Times grafted the *Engliſh* upon the *Dutch* Elm.

Now, theſe Things being conſider'd, 'tis very ſurpriſing, that any Perſon could attempt the obtaining of a Patent for an old Practice, under Pretence of a new Diſcovery; ſince moſt Gardeners and Nurſerymen in *England*, had practiſed the ſame many Years ago. But to the Matter in Hand, I adviſe every one that plants Elms, with Hopes of having them large and ſtately Trees, to plant the true Mountain or *Engliſh* Elm, raiſed from Suckers or Layers; which laſt is the moſt expeditious Way of the two.

And indeed, if we rightly conſider the Matter, we have no Sort of Occaſion for grafting the *Engliſh* upon the *Dutch* Elm, to haſten and augment the Growth of their

Heads; ſince by raiſing Elms from Layers, we obtain fine ſtately proportion'd Headed Plants, in five or ſix Years Time; that we are certain will afterwards afford both Pleaſure and Profit.

HAVING thus, for the Sake of Poſterity, caution'd the planting of grafted Elms, I will, for the Encouragement of Gentlemen, demonſtrate the great Advantages that ariſe from Plantations of this ſtately Tree, and the beſt Manner of performing and ordering them, after planting, until they become good Timber, fit for the Uſes before mention'd.

THE firſt Thing to be done, is to make Choice of a proper Soil, as before mention'd, which we will here ſuppoſe to contain twenty Acres only; by which, we may account for a greater or leſſer Quantity.

BEING provided with Land, fitted for our Purpoſe, we muſt cauſe the ſame to be well trenched with ſmall Spits, in *October* or *November*, and therein plant at 20 Feet Diſtance, young Layers, or Suckers of three or four Years Growth, that have been diſbudded in the Nurſery, in order for making Standards, as before directed, which plant with

with all the Roots poſſible, and carefully preſerve their leading Shoots.

In the Spring following, *viz.* in *March*, and *April*, when the Weeds begin to grow, cauſe them to be carefully houghed, and plac'd about their Stems, to prevent the Sun from drawing away ſuch Moiſture, as is neceſſary for their Support.

And if Water happens to be near at Hand, it will be well worth our While to keep them well water'd throughout the firſt Summer; and therefore at planting, or rather, at firſt houghing in *March*, they ſhould have Concaves made about their Stems, (which by Gardeners are called Cups) to contain the Water, at the Times of watering.

A Plantation thus encouraged the firſt Year, will become Timber, at leaſt ten Years ſooner than thoſe that have the Spring and Summer's Rains only, excepting when thoſe Seaſons are very wet and warm, which no Man can inſure or depend on. And ſince that there is no Gentleman, but can imploy his Servants, when ſuch new Plantations are plentifully ſupplied with Moiſture from the Heavens; we may at thoſe Times decline our artificial Waterings;

but when they are long abſent, and Seaſons become hot and dry, we muſt then begin our Waterings again.

IF Ponds or Rivers are far diſtant from our Plantations, it will be beſt to ſink one or more Wells, if the Springs don't exceed thirty two Feet, or thereabouts in Depth; and therein place Elm Pumps, by whoſe Help a Water-Cart is ſoon filled, that with a leathern Pipe fix'd to its Bottom, will very expeditiouſly water the ſeveral Plants. But where Water is inacceſſible, the only Means that we can uſe, is to plant very early, at the End of the Autumn, that they may ſtrike Root before the Spring, and have the Benefit of the Winter's Rains, that are very great Supports to them, if the ſucceeding Spring and Summer happens to be dry.

EVERY Tree being planted at twenty Feet Diſtance, each Tree will have 400 ſquare Feet to extend its Roots in, and an Acre will contain one Hundred and eight Trees; for in an Acre of Land there is contain'd, one Hundred and eight Times four Hundred Feet, and 360 remaining. Obſerve the Calculation.

An

An Acre contains 160 Poles
And each Pole $272\frac{1}{4}$

320
1120
320
40

The Feet in an Acre, div. by 400)43560(108. The Number of Trees in one Acre.
400

3560
3200

360 remains.

If we multiply 108 by 20, the Number of Acres, the Product will be 2160. The total Number of Trees to be planted in twenty Acres.

108
20

Product 2160 as required.

The Expences of trenching may be computed as following.

	l.	*s.*	*d.*
FOR trenching of twenty Acres of Land two Spit and a Crumb at 6 *d. per.* Rod	80	00	00
FOR taking up, pruning, and planting the Trees, at 3 *s. per* Hundred.	3	3	6
FOR one Man, five Months to watering, (the Horſe, Cart, &c. ſuppoſed to be already provided for other Uſes) at 9 *s. per* Week.	9	0	0
FOR houghing four Times the 2160 Trees, *viz.* about 18 Inches about each, (the whole Quantity being leſs than 60 Rods,) at 10 *s. per* Acre, every Houghing. Therefore,	0	15	0
THE Whole Expence of planting and firſt Year's keeping, is,	92	18	6

N. B. The Value of the Land wherein our Nurſery is made that raiſed 2160 Trees being very inconſiderable, is not worth our while to account it any more than the now and then a Day, for one Man, to dig and hough them, lay them down in the Spring, and tranſplant them out at *Michaelmas* after.

THIS

	l.	*s.*	*d.*
THIS new Plantation being thus managed the firſt Year, at the *Michaelmas* following their planting, they muſt be digged about their Roots, as before directed for the Oaks; the Expence of which will amount to, at 3 *d. per* Rod, about	0	15	0
AND if to this we add for the next Summer's Houghing.	0	15	0 more
The Sum	1	10	0 will

be the Expence of the ſecond Year's Keeping, and the like for eighteen Years after; at which Time they will require no more ſuch Care in keeping.

Now let us paſs through the whole Expence as it ariſes, with its Intereſt for twenty Years, ſuppoſing that the Land were of no Uſe, than for the Support of the Trees, which it need not be, for as they are to be yearly disbudded of their lateral Buds, their Top-branches will ſhade very little: So that for the firſt ten or twelve we may be ſure of good Crops of Corn from among them, and afterwards Paſture for Sheep, Cows, *&c.* But notwithſtanding that

the Land is capable of producing theſe Crops; yet I will in this Calculation ſuppoſe that no ſuch Crops were to be produced, and that the Land is wholly employ'd to the Uſe of the Timber Trees.

I will ſuppoſe the annual Rent of the Land at 5 *s. per* Acre, as before in the Oaks.

BEING thus prepared, we will now proceed to the Calculation.

	l.	*s.*	*d.*
The Expence of Planting, and the firſt Year's keeping.	92	18	6
The Rent of 20 Acres the firſt Year.	5	0	0
The Expence at the firſt Year's End.	97	18	6
The ſecond Year's Keeping, as above.	1	10	0
The Intereſt of 97 *l.* 18 *s.* 6 *d.* for one Year.	4	17	11
The Expence at the ſecond Year's End.	104	6	5
The third Year's keeping.	1	10	0
The Intereſt of 104 *l.* 6 *s.* one Year.	5	4	3
The Expence at the third Year's End.	111	0	8

The

	l.	*s.*	*d.*
Brought over	111	0	8
The fourth Year's keeping.	1	10	0
The Intereſt of 111 *l.* 8 *d.*	5	11	0
The Expence at the fourth Year's End.	118	1	8
The fifth Year's keeping.	1	10	0
The Intereſt of 118 *l.*	5	18	0
The Expence at the fifth Year's End.	125	9	8
The ſixth Year's keeping.	1	10	0
The Intereſt of 125 *l.* 9 *s.* 8 *d.* almoſt	6	05	0
The Expence at the ſixth Year's End.	133	5	2
The ſeventh Year's Expence.	1	10	0
The Intereſt of 133 *l.* 5 *s.*	6	13	3
The Expence at the ſeventh Year's End.	141	8	5
The eighth Year's Expence	1	10	0
The Intereſt of 141 *l.* 8 *s.* 5 *d.*	7	1	5
The Expence at the eighth Year's End.	149	19	10

	l.	*s.*	*d.*
Brought over	149	19	10
The ninth Years' Expence.	1	10	0
The Intereſt of 149 *l.* 19 *s.* 10 *d.* almoſt	7	10	0
The Expence at the ninth Year's End.	158	19	10
The tenth Year's Expence	1	10	0
The Intereſt of 158 *l.* 19 *s.* 10 *d.* almoſt	7	19	0
The Expence at the tenth Year's End	168	8	10
The Eleventh Year's Expence	1	10	0
The Intereſt of 168 *l.* 8 *s.* 10 *d.*	8	8	5
The Expence at the eleventh Year's End	178	7	3
The twelfth Year's Expence	1	10	0
The Intereſt of 178 *l.* 7 *s.* 3 *d.*	8	18	4
The Expence at the twelfth Year's End	188	15	7
The thirteenth Year's Expence	1	10	0
The Intereſt of 188 *l.* 15 *s.*	9	8	9
The Expence at thirteen Year's End	199	14	4

The

	l.	*s.*	*d.*
Brought over	199	14	4
The fourteenth Year's Expence	1	10	0
The Intereſt of 199 *l.* 14 *s.* 4 *d.* almoſt	9	19	9
The Expence at fourteen Year's End	211	4	1
The fifteenth Year's Expence	1	10	0
The Intereſt of 211 *l.* 4 *s.* 1 *d.*	10	11	2
The Expence at fifteen Year's End	223	5	3
The ſixteenth Year's Expence	1	10	0
The Intereſt of 223 *l.* 5 *s.* 3 *d.*	11	3	3
The Expence at ſixteen Year's End	235	18	6
The ſeventeenth Year's Expence	1	10	0
The Intereſt of 235 *l.* 18 *s.* 6 *d.*	11	15	10
The Expences at ſeventeen Year's End	249	4	4
The eighteenth Year's Expence	1	10	0
The Intereſt of 249 *l.* 4 *s.* 4 *d.*	12	9	2
The Expence at eighteen Years End	263	3	6
The nineteenth Year's Expence	1	10	0
The Intereſt of 263 *l.* 3 *s.* 6 *d.*	13	3	0
The Expence at nineteen Year's End	277	16	6

The

	l.	*s.*	*d.*
Brought over	277	16	6
The twentieth Year's Expence	1	10	0
The Intereſt of 277 *l.* 16 *s.*	13	17	9
The total Charge in 20 Years	293	4	3

'Tis well known to every Farmer, that an Elm of 20 Years Growth, is worth upwards of 20 *s.* But there I will ſtate their Value. Now the Quantity before ſuppoſed to grow on 20 Acres, were 2160, which at 20 *s. per* Tree, comes to 2160 *l.*

The annual Rent accounted for in the preceding Calculation being but for the firſt Year, we muſt therefore add	95	0	0
For the nineteen Years after, and for the ſimple and compound Intereſt thereof	83	0	0
Sum	178	0	0
To which add the preceding Sum	293	4	3
Sum	471	4	3

Which being ſubſtracted from 2160 *l.* leaves the neat Profit

	2160	0	0
	471	4	3
l.	1688	15	9

The

The neat Profit clear of all Outgoings; beſides the Advantages of the under Crop, as before noted.

Now, as 20 Acres is to	1688	15	9
So is 100 Acres to	8443	18	9
And 1000 Acres to	84439	7	6

Neat Profit, clear from all Expences whatever, Felling excepted, which the Top will over pay.

AGAIN, as the Expence of 20 Acres is to	471	4	3
So is the Expence of 100 Acres to	2352	13	0
And the Expence of 1000 Acres to	23526	10	0

Now by comparing theſe Advantages, and Expences together, we may ſee what vaſt Improvements may be made in the ſmall Space of twenty Years. Thus in the largeſt Account it evidently appears, that by the gradual advance of 23526 Pounds in twenty Years Time, which is but 1176 *l.* 6 *s.* 0 *d.* *per Annum*, we gain 84439 *l.* 7 *s.* 6 *d.* which at 5 *per Cent.* is worth four thouſand, two hundred, and twenty one Pounds, nineteen Shillings *per Annum.*

BUT as Elm is generally at its Maturity, at 40 Years, we ſhould with Patience wait until

until then, at which Time it will be worth three times the Money it was 20 Years before. But if we ſuppoſe it double the Value, *viz.* 168878 Pounds, it will be found to have very well anſwered our Labour and Expence.

Nor is here any Danger, or need of Inſurance, as in Building, Trading abroad, *&c.* or any extraordinary Taxes, Duties, Cuſtoms, *&c.* but all free, and in continual Safety, under our own Eyes at all Times: Which to a noble Mind muſt be very entertaining.

Besides the aforeſaid Method of Planting entire Woods of Elm, we may reap very great Advantages from the Hedge-rows of our Encloſures; if we are but careful enough to plant them therein at 15 or 20 Feet Diſtance, when we plant our Quickſets, and keep them carefully disbudded from their lateral Buds, as they appear in the Spring. And even in old planted Hedges, we ſhould plant them in like Manner, firſt preparing their Holes before they are planted with good freſh Earth, which will enable them, till they have acquired Strength, to ſhift for themſelves.

Every

EVERY hundred Rod of Hedging thus planted, will, in forty Years Time, be worth near two hundred Pounds.

IN brief, if the Timber-trees of Oak and Elm, in Hedge-rows, are manag'd with good Husbandry, in many Countries, they will in twenty Years Time be worth all the Land they encloſe, provided that each Encloſure does not exceed 6 or 8 Acres, which are Fields of a very good Size for the Farmer.

HAVING thus demonſtrated the great Advantages that may ariſe from Plantations of Oak and Elm, I can't believe, but that every Gentleman will be induced to make large Plantations thereof with convenient Speed, and more eſpecially, ſince the Intereſt, Commerce, and Safety of this moſt powerful and glorious Nation, wholly depends on its Shipping, and they on continued Plantations of Timber; which if neglected, what ill Conſequences muſt enſue. And indeed, if I may be permitted to ſpeak the Truth, we are purſuing thoſe unhappy Conſequences with all the Vigor imaginable. For as the annual Conſumption of Timber is, and has been for many Years paſt very large, our Woods are nearly exhauſted; and where there's

there's one Acorn planted for a Succeſſion, there's a hundred Oaks felled, and no Proviſion made for Poſterity.

WHAT a pity would it be, ſhould this glorious and powerful Nation, who is bleſſed with an illuſtrious Family, become a Sacrifice to its Enemies for Want of Timber to build Ships (or rather floating Caſtles) of Defence; wherein its Power and Commerce wholly conſiſts. But ſuch unhappy Days, I hope, will never happen; nor is there any Reaſon to fear it, ſince their moſt Sacred Majeſties, and the Nobility of *Great Britain*, are greatly delighted with the rural Pleaſures of Planting and Gardening.

CHAP. V.

Of the Perſpiration of the ASH, *its Manner of raiſing and ordering for Timber, and Underwood, in Parks, Woods, Foreſts, Coppices,* &c. *And the Advantages that ariſe from ſuch Plantations.*

THERE are ſeveral Kinds of Aſh growing in *England*, but thoſe for Timber are but two, which are diſtinguiſhed

ed by the Names of Male and Female: The one bearing Keys in great Plenty, and the other few, if any.

THESE Kinds of Aſh delight in different Soils and Situations, *viz.* the one on Hills, Mountains, *&c.* and the other in Valleys, low Grounds, *&c.* whereby their Growths are different.

THE Female Aſh delights in the low Grounds, and hath its Wood much whiter than that on the Hills, and grows to a larger Stature in equal Times; and that very ſoon. The learned Mr. *Evelyn* reports in his *Sylva, Chap.* 6. *Pag.* 38. That the Female Aſh hath many times riſen to ſuch prodigious Statures, ſo as in forty Years Growth from the Key, an Aſh hath been ſold for thirty Pounds Sterling. And Mr. *Bradley*, in his new Improvements of Planting and Gardening, *Part* I. *Page* 43. tells us, that he has heard of Aſh Trees of forty Years Growth from the Key, that have been ſold for twenty five Pounds *per* Tree.

THE Uſes that this kind of Timber is apply'd to, is the making of Oars, Shevers, Boat-Staves, Maſts for Boats, Barges, Spreets, Blocks, *&c.* To the Gun-ſmith for

Gun-ſtocks; to Wheel-wrights for Ploughs, Harrows, Waggons, *&c.* and in brief, to ſo many other Uſes, that they are almoſt endleſs to enumerate—And indeed, were theſe Trees not very uſeful, it had been impoſſible for one Perſon to have had a Plantation of his own raiſing, worth fifty thouſand Pounds, to be ſold, which Mr. *Evelyn* makes mention of in his *Sylva*.

THE Price that is uſually paid *per* Load for this Sort of Timber, is more or leſs, as it is in Length and Girt, ſome being worth 3 *l.* 10 *s.* *per* Load, and ſome but 3 *l.* 50 *s.* 40 *s.* *&c.*

THE beſt Aſh is always produced in the beſt Lands, which it ſoon impoveriſhes; and therefore, ſince 'tis of ſuch a ravenous Nature, 'tis beſt when mix'd with Tap-rooted Trees, at large Diſtances.

I cannot recommend the planting of this Tree in the Hedges of our Encloſures of Meadow or Corn, for their Roots extending themſelves far from their Bodies, and very ſhallow withal, do greatly impoveriſh the Graſs, or Corn, growing near them: Nor can the Heithorns have any Share with them, that grow under their Drip; ſo that

if we intend to have good Fences, we muſt not plant the Aſh therein.

THE Aſh is raiſed from Seed, (called Keys) which are to be gathered when they begin to fall, about the end of *November*, or beginning of *December*, at which Time you muſt be careful not to bury them too deep; About two Inches deep is fully ſufficient; but they will not come up, until the ſecond Spring after Sowing; during which time, they muſt be carefully kept clean from Weeds, and moiſt in very dry and hot Weather.

WHEN they come up, you muſt keep them water'd during the Spring and Summer, (if the Weather is dry) and free from Weeds. And in the beginning of the Winter following, take them out of the Seed-Bed with a Trowel, that their Roots may not be ſtrained in drawing; which cauſes them to periſh after tranſplanting.

N. B. You muſt prune off their downright or tap Roots; but not any of their lateral Roots. You muſt alſo preſerve their Tops from the Knife and Bill at all times, excepting the ſecond Year after tranſplanting, when you muſt cut off their Heads, within an Inch or two of the Ground,

which will cauſe them the next Spring to ſhoot away with an abundance of Vigour, ſo as in few Years to become large Trees.

N. B. THAT if they are very ſmall at the end of the ſecond Year, 'twill be beſt to let them remain in the Seed-beds a Year or two longer, until they are large enough to tranſplant; which is when they are about the Bigneſs of a Tobacco-pipe, or Gooſe-quill.

THE Diſtances that they ſhould be planted at, are about one Foot Square, in ſtreight Lines, after the Manner of Beds, leaving between every fourth and fifth Row, an Alley of two Feet and half in Breadth, wherein they may remain for the Space of two or three Years at moſt; after which they ſhould be tranſplanted in the Places where they are deſign'd to remain; or into a Nurſery, as directed in my new Principles of Gardening.

THE proper Diſtances to plant the Aſh at, when 'tis planted out for good and all, are fifteen or twenty Feet, provided that we carefully diſplace all the lateral Buds every Spring, as they appear.

I obſerve, that Mr. *Evelyn*, in his Diſcourſe on Foreſt Trees, *Page* 39. directs,

when we make Plantations of Coppices, coning of ſeveral Kinds of Trees, every third at leaſt ſhould be an Aſh. For as the Aſh is known to be a very great Impoveriſher of Land, by its great imbibing Power, which is ſuperior to all other Timber Trees; it therefore follows, that they muſt be greatly injured thereby; and eſpecially the Elm, whoſe Roots run very ſhallow alſo. But for Oaks, whoſe Roots penetrates the Earth for their Nouriſhment much deeper, they may be out of their Power of being prejudiced by them. But however, I cannot recommend the Aſh for a Companion with Trees, whoſe Roots run ſhallow as theirs; and therefore I would always chuſe to plant them with tap rooted Trees, as Oaks, *&c.* rather than Elms, or other ſhallow rooted Trees.

ASHES planted with Oaks, Cheſnuts, *&c.* in Plumps, on the tops of little Hills in Parks, *&c.* have a very good Effect, and become good Timber very ſoon, their Soils being very freſh and generally fertile. And as I have before proved, that Trees draw one another up, when planted very near together, for want of a free circulating Air about their lower Parts: I therefore re-

commend their planting ſomething nearer to one another, than the Diſtances before aſſigned, that thereby they may be ſoon drawn up to great Heights, whereby they will have a fine Aſpect in a ſhort Time.

'Tis the Opinion of ſome, that to propagate the Aſh from their Keys, as here deliver'd, requires more time, than to gather Suckers out of the Woods, and plant them; becauſe ſay they, whilſt their Keys lie preparing themſelves a full Year in the Ground, thoſe Suckers will have ſtruck Root, and made a Shoot, and after them others, in the ſucceeding Years, much ſtronger than thoſe from the Keys: But 'tis a great Miſtake, for tho' they will make a Shoot in the firſt Year, whilſt the Keys are preparing themſelves in the Earth, yet 'tis ſo very inconſiderable, as of no Value; for the Suckers of Aſh drawn out of the Woods are very rarely well rooted; and therefore they are as long (and oftentimes much longer) a getting good Roots, as the Keys are Germinating; which when they ſtrike Root, being naturaliz'd to the Ground, are always ſtronger, and ſhoot with much greater Vigour than the Suckers, whoſe Roots are at firſt planting, unacquainted with the Soil:

In

In brief, I muſt take the Liberty of adviſing againſt the planting of Suckers; for I having ſeen the Experience thereof, and know that they will never anſwer the deſired End of making good Timber in a ſhort Space of Time, as thoſe Trees raiſed from Keys never fail of doing; I muſt alſo caution the planting of another Sort of Aſh, that is a low Grower, and very knotty, not worth our while to plant for Underwood, or any other Uſe whatever, known to moſt Husbandmen.

HAVING thus declared the raiſing of Aſhes for Timber, I will now proceed to explain the Propagation of the Aſh for Coppice-wood, which is very advantageous alſo.

To have fine Coppices of Aſh, we muſt make Choice of the beſt Land we have, which ſhould be well ploughed in the Summer Seaſon to mellow. This being done in the Spring, when 'tis the Seaſon for ſowing Barley, it muſt be plough'd again, and then ſow'd with Aſhen-keys, and Barley alſo; for as the Keys will not come up until the Spring after ſowing, you may very well have the Benefit of the Barley the firſt Year. In the end of the following Autumn, after ſowing, cauſe the Barley-ſtubble to be thin-

ly hough'd over, which will mellow the Surface of the Earth, and permit the Rains to paſs freely therein. About the middle of *January* following, (if the Froſts are over) give your Land a ſecond thin houghing again, which will looſen and mellow the Surface, ſo that the tender *Plumes* of the Keys may with eaſe riſe through the ſame.

When the young Seedlings have riſen high enough to ſtand the Hough, you muſt then hough them out, at about five Feet apart; and the oftner your Seedlings have the Earth ſtirr'd about them with houghing, the better they will thrive. And in the beginning of the Winter following, the Surface of the Ground ſhould be turned, (that is, lightly digg'd) about half a Spit deep, which will mellow the Surface, for the tender Fibres to eaſily ſtrike therein. And afterwards in the Spring, when the Weeds begin to riſe, then hough them down; and ſo in like Manner you muſt continue to do, until the Shade of your Nurſery prevents their longer Growth.

The Quantity of Plants that one Acre will produce at five Feet ſquare of one another,

ther, is seventeen Hundred and sixteen, which I thus prove.

REDUCE the Length of an Acre into Feet, and divide them by five; the Quotient is the Quantity in an Acre's Length. Thus 40 Poles multiplied by 16 ½, produces 660; which being divided by 5, the Quotient is 132.

	Poles.		
An Acre's Length	40		
Feet in a Rod or Pole	16 ½		
	240		
	40		
	20		
Divided by 5	660	(132.	The Number of Plants in an Acre's Length.
	5		
	16		
	15		
	10		
	10		
	00 Remains.		

Now, an Acre's Breadth being 4 Poles, multiply and divide as before.

An

An Acre's Breadth 4 Poles.
Multiply by 16 ½

Divide by 5) 66 Foot (13. The Number of Plants in an Acre's Breadth.
65

1 Remains.

If you multiply 132, the Number in the Length, by 13, the Number in the Breadth, the Product will be 1716, the Quantity required.

Trees in an Acre's Length. } 132
Trees in an Acre's Breadth. } 13

396
132

Product 1716

When we are to raiſe Coppices of Aſh mix'd with Oak, Cheſnut, *&c.* we muſt prepare our Lands by often and early ploughing, as before directed; and in *February* ſow your Aſhen-Keys (being gather'd a Year before, and kept in Sand, as directed

directed for the Acorns of the Oak) with the Acorns, Cheſnuts, Hazelnuts, *&c.* (which alſo ſhould be kept in moiſt Sand, from their Gathering to the Seaſon for ſowing, or otherwiſe they will ſhrivel and periſh); and when they are all come up, (which will be by the End of *April*, &c.) they ſhould be hough'd out at the Diſtances of five Feet, leaving an Oak, Cheſnut, and Hazel at equal Diſtances, (or near thereto) between every two Aſhes, whereby their ſeveral Roots of every Kind will be at competent Diſtances from each other, and will be much better nouriſhed, than when ſeveral Plants of one Kind are near together.

THIS Rule being obſerv'd, the ſeveral Kinds will be at twenty Feet apart from one another, (being accounted forward in a right Line) for they having between every two of them an Oak, a Cheſnut, and a Hazel, each at five Feet Diſtance in the Line, their Diſtances muſt be twenty Feet, and the like of all the others. Now, the ſecond Line being but five Feet from the firſt, you muſt obſerve to leave the Aſhen Plants therein, as nearly againſt the Midſt of the Intervals of the firſt as can be;

be; which being well obſerv'd, will place all the other Kinds in the ſame Poſitions. The Space that each Kind of Plant has to extend its Roots, before they meet any of their own Kind, (ſuppoſing all their Growths are equal) is one Hundred ſquare Feet, *viz.* at twenty Feet Diſtance in the Rows, and five Feet Diſtance one Row from the other. Now, ſuppoſe that the Roots of any one Kind of the ſeveral Trees were forty Years extending themſelves all over the Hundred Feet, and in that Time wholly impoveriſh'd that Space of all the Nouriſhment natural to that Plant: Why then 'tis reaſonable to ſuppoſe, that if the other Trees of Oak, Cheſnut, and Hazel were Aſhes alſo, (as I ſuppoſe the other to be) that Space of Land would be equally impoveriſh'd in the Space of ten Years, it having there four Times the Demand of Nouriſhment to the ſame Kind of Tree. Therefore, to have Coppices endure many Years, we muſt intermix ſeveral Kinds together, and not entirely of any one Kind.

OAKS, Hazel, and Cheſnut imbibe the Juices of the Earth with as great a Force as the Aſh, but not the ſame; for that Nou-

Nouriſhment or Juice that is imbib'd by the Oak, is of a quite different Nature from that which nouriſhes the Aſh, and the like of all other Plants; for the Earth contains as great a Variety of Juices, neceſſary to the Support of Plants, as its Plants differ among themſelves.

TAKE up a very old Tree of any Kind 'tis no Matter what, and in its Place plant a young one of the ſame Kind, and mark the Conſequence; or rather take up two of the ſame Kind, on the ſame Piece of Land, as near to one another as poſſible; in the Place of any one, plant another of the ſame Kind, and in the Stead of the other, plant another Tree of a quite different Nature; which laſt will thrive very well, whilſt the other will but keep its ſelf alive, and not thrive at all, the neceſſary Juices being by the former Tree nearly or wholly exhauſted: And therefore 'tis a general Rule, never to plant the ſame Sort of Plant, where one of the ſame Kind grew before, in the ſame Earth. This is well ſupported by Reaſon, for were all Sorts of Plants to imbibe one and the ſame Kind of Nouriſhment, then but one Kind of Land would be neceſſary for their Nouriſhment,

or

or all Sorts of Plants would thrive equally in any Kind of Land, which they are by Experience found not to do. Theſe are ſufficient Reaſons, why 'tis beſt to plant Coppices with different Kinds; for tho' their Roots may perhaps run over the whole Ground, as ſoon as when planted entire of one Kind, yet their different Natures imbibing different Juices, do not impoveriſh the Soil ſo ſoon, as when it happens in Avenues of Lime, or Elm-Trees, *&c.* that one or more die when largely grown.

THE beſt Way to make good ſuch Plantations, is to dig for every Tree a very large and deep Hole where the former grew, carrying away all the Earth, and inſtead thereof, bring as much of the firſt Spit of a freſh Common or Meadow, and therein plant your Trees, which, if well perform'd, will take Root, and grow away ſtrongly.

THE Quantity of old Earth to be taken away from each Tree ſhould be a Circle of ten Feet diameter, and two Feet deep, wherein the Roots will thrive for many Years before they come to ſtick in the natural Earth, and in that Time be well ſtored with ſufficient Juices, neceſſary for the Support of their Roots, to ſtrike therein.

THE

THE Aſh being a free Grower, is fit to fell for Coppice-Wood, at nine, ten, or twelve Years Growth, but the longer the better; and for Timber, when it has had about thirty five or forty Year's Growth, during which Time we ſhould obſerve, that the firſt four or five Years they be kept clean from Weeds, by often houghing; that the Earth be ſtirr'd about them, by digging in *October* or *November*; that they be at all Times preſerv'd from Cattle, Deer, Goats, *&c.* that their leading Shoots be preſerv'd, and that thoſe intended for Timber have their lateral Buds diſplaced, as they break out in the Spring; which will add very very much to their Bigneſs and Heighth, and cauſe their Timber to be clear from Knots, and conſequently of a much greater Value.

THE Seaſon to fell Aſh, either in Coppice or Wood, is about the Middle of *December*, when their Sap is moſt condenſed by the Winter's Cold; and in the following Spring they will ſhoot up again with Vigour, provided that you cut them off about ſix Inches above Ground, and take Care that the Face of their Cuts are towards the South, that the Sun may the ſooner

ſooner heal their Wounds, and be leſs ſubject to imbibe Wet.

Per damna, per cædes, ab ipſo
Ducit opes animumque ferro.

By Havock, Wounds, and Blows,
More lively and luxuriant grows.

N. B. If the Aſh is cut down, when its Sap is any thing vigorous, it will, by putrifying, breed a Kind of Worm, that's as very injurious to the Timber.

CHAP. VI.

Of the Beech, its Manner of raiſing and ordering for Timber, and Underwood, in Woods, Parks, Forreſts, Coppices, &c.

THE Kinds of Beech, that we have in our Woods and Foreſts, are two, the one called the *Mountain Beech*, (where it moſt delights to grow, and the other, *campeſtral*, or wild, growing in level and low Lands.

THE

THE Wood of the Mountain Beech is whiter than the other, which is of a blackiſh Colour, and a longer Duration.

THE Soil wherein the black Kind delights, (that being the beſt to propagate, with Reſpect to its Duration) is that in Vallies, or level Lands that are warm, as alſo in ſtony and barren, as rich loamy Lands: So alſo will the Mountain Kind, which laſt will grow to a ſtupendous Procerity upon the Tops, and Declivities of chalky Hills, where few or any other Kinds of Trees will keep alive; and wherever the Oak thrives, the Beech will, they delighting very much to grow in Conſort.

THESE Kinds of Beeches are raiſed from their Seeds, called *Maſt*, which ſhould be gathered in *October*, and may then be ſown, or otherwiſe put into Sand as the Acorns, and ſow'd in the Middle of *February* following, being afterwards ordered in every Reſpect, as the Oak, or Aſh: You may alſo gather young Seedlings out of Woods, from under large fruitful Trees, that have ſhed their Maſt, which will become good Trees alſo, provided that you preſerve all their Roots that's poſſible, and prune their Tops to about five or ſix Inches in Length.

THE beſt Size for to get thoſe Seedlings, is about the Bigneſs of a Tobacco Pipe, or hardly quite ſo large, for it is not the very large Seedlings of a long Standing, that make the beſt Trees.

THE Diſtances that they ſhould be planted at, when ſo little, is one Foot in the Rows, and each Row two Feet apart.

THE beſt Seaſon for this Work, is about the Middle of *October*, or Beginning of *November*; after which, in the Spring, we ſhould diſplace their Buds, as directed for thoſe of young Elms.

BUT if we would plant them out where they are to remain, when they are ſo very young, we ſhould allow them fifty Feet Diſtance, excepting that we want Plantations thereof to grow very high in a ſhort Time, and then we may plant them at ten, twelve, fifteen, twenty, *&c.* Feet Diſtance, which near ſtanding together, will cauſe their lower Branches to be ſaturated with Sap, and their Tops advance greatly in Heighth, by having a free Perſpiration in the dry open Air.

'TIS a great Pity, that the Propagation of this Kind of Tree has been (and is) ſo little regarded; its Uſe being ſo very great, that

that not only for Fuel, (which 'tis one of the very best, and well known to the City of *London*, which every Year consumes many Thousand Stacks thereof); but for many important Uses in Architecture, particularly in building Water-Works, all Sorts of Mills, for Rimbs of Wheels, Staves, Coggs, &c. exclusive of the several Uses of the Houshold.

Hinc olim juvenis mundi melioribus annis,
Fortunatarum domuum non magna supellex:
Tota patebatur; sellas, armaria, lectos,
Et mensas dabat, & lances, & pocula Fagus, &c.
Couleii *Pl. L. 6.*

Hence in the World's best Years the humble Shed,
Was happily, and fully furnish'd:
Beech made their Chests, their Beds, and the join'd Stools.
Beech made the Board, the Platters, and the Bowls.

An happy Age it seems ——
—— *No Wars did Men molest,*
When only Beechen Bowls were in Request.

From the Mast, is extracted an Oil, that would be very advantageous to this King-

dom, had we but plenty of Trees to produce Maſt in abundance. 'Tis an excellent Food for Deer, Swine and Fowls, and the Leaves make very agreeable Mattraſſes.

NAY, Mr. *Evelyn* ſays, the very beſt and eaſieſt of any in the World, being gathered ſomewhat before the Froſt takes them at their Fall. And further adds, that by their Tenderneſs, and looſe lying together, they continue ſweet for ſeven or eight Years; and that he himſelf has ſometimes lain on them (when in *Switzerland*) to his very great Refreſhment; ſo (ſays he) of this Tree it may properly be ſaid,

——*Sylva domus, cubilia frondes.*

Juvenal.

The Woods a Houſe, the Leaves a Bed.

THE Seaſon to fell this ſtately Tree is *November* or *December*; and the Maſt is eatable (for Swine) in *Auguſt*. Theſe noble Trees make beautiful Figures in the Garden, when trained up in Hedges, to encloſe Walks, Quarters of Wilderneſſes, *&c.*

THEIR Manner of planting therein, is as before, only we muſt plant them at fif-

teen or eighteen Inches apart, inſtead of a Foot. And in the Spring, when they break into Buds, rub off all the forward ones, and thereby the others will be ſtrengthened very much. And ſince that the thickening of Hedges depends upon the Quantity of ſide Branches, it would be very commendable in us, to obſerve how we place the ſide Buds of every Plant, that when they break out in the Spring, their greateſt Quantity may lie fluſh with the Line of the Hedge, whereby 'twill ſoon be thickened. And in the Spring, when we obſerve any Plants to puſh away with one ſtrong Shoot only, then to pinch off the extream Part thereof, which will cauſe ſeveral other Branches to break out, that become thick and regular; whereby our Hedges will riſe equally in all their Parts.

ABOUT the middle of *September*, we may clip the Sides of our Hedges, but never their leading Shoots; and in four or five Years, they will become very thick and handſome.

N. B. THAT it is the Practice of many, to plant double (and ſometimes treble) Rows of theſe young Plants, to cauſe a thick Hedge; but I cannot commend it;

for by their being planted ſo near together, they cannot have a free Perſpiration; and 'tis therefore that they do not thrive.

In this Manner there are many beautiful Hedges of Hornbeam planted, of which in its Place, that are graceful to Gardens; and when Beech and Hornbeam are diſcretionally mixt together in a Hedge, they make a very beautiful Mixture and Variety.

Chap. VII.

Of the Birch-Tree, *its Manner of raiſing in Coppices, Gardens, &c.*

Because that this Tree does not produce good Timber for building, therefore few or any cares to propagate it: But were the Proprietors of poor barren Lands as well acquainted with its Nature as I am, they would greatly improve ſuch Lands, by making Plantations thereof: For the Nature of this Tree is ſuch, that let the Soil be dry, wet, gravelly, clayey, ſandy, marſh or boggy, 'twill thrive very well; nay, in the uliginous Parts of Foreſts, Parks, *&c.* where ſcarcely any Graſs or Weeds live,

live, they do ſpontaneouſly grow in abundance, to very great Statures.

And altho' its Wood is not fit to be uſed in Buildings, yet 'tis of great Service to the Cooper for Hoops, as well as to the Turner, for making divers Houſhold Utenſils, and to the Husbandman, for Withes, Brooms, *&c.* ſo that we may aſſure our ſelves of a Market for it, when ſaleable, to the very great Improvement of ſuch barren Lands, that before were uſeleſs.

These Trees are propagated from the Suckers as the Elm, and become Trees very ſoon, provided that the Land is not ſo rich; for as I ſaid before, they delight and thrive beſt in barren Lands.

The beſt time to plant them is *October*, that they may ſtrike Root by the Spring, when it often happens to be attended with much Drowth. The Manner of planting them in Coppices, is the ſame as of the Aſh, *&c.*

N. B. Those who deſire to know the making of Wine with the Sap of theſe Trees, I refer them to my new Principles of Gardening, *Page* 138.

CHAP. VIII.

Of the Perſpiration of the Platanus, *or old* Roman Plane-Tree: *Its Manner of raiſing and planting in Avenues, Walks, Groves, Eſpaliers,* &c.

THE *Romans* were the firſt that brought this noble Plant from the *Levant*, ſparing neither Coſt or Pains in its Cultivation; inſomuch, that *Cicero* and *Hortenſius* would oftentimes pour Wine to their Roots, inſtead of Water, their Value for them being ſo great; and indeed, they are in my Eye, one of the moſt beautiful Trees that we have in our Wilderneſſes or Groves; and 'tis therefore that I am ſurpriz'd to ſee them ſo little regarded.

BESIDES the old *Roman* Platanus, there are two other Kinds, which have ſome difference in their Leaves; but their Growth is much the ſame. They are in general encreas'd by Layers, as the *Elm*, *Lime*, &c. or from their Seed. They delight in a freſh, rich, and moiſt Loam, and as their Wood is ſomething hard, their Layers ſhould be laid down in *October*, wherein 'tis to be

be obſerv'd, that as their Leaves are very large, they therefore require to have their Layers laid at a much greater Diſtance, than *Elms* or *Lime*, whoſe Leaves are leſs; for if they have not a free Perſpiration, 'tis impoſſible they can live.

By the next Autumn, after laying down, they will be well rooted, and then they muſt be taken from the Stools, and planted out in a Nurſery, as directed for the *Elm*, but at ſomewhat greater diſtance.

It has been the Practice of many, to plant this Tree with *Lime* Trees, which is entirely wrong; becauſe theſe Trees do not come into Leaf ſo early as the Lime, and are then ſomething diſagreeable.

The Wood of theſe Trees, (as I before obſerved) is very tough and hard, and therefore reſiſts the Violence of the Winds.

They are free Growers, and oftentimes arrive to vaſt Magnitudes, as appears by the 21*ſt*. Chapter hereof. In ſhort, their Beauty is ſo very great, that I can't but recommend the planting of ſome Avenues, Walks, Groves, *&c.* in every Gentleman's Garden, whoſe Soil is natural to them.

CHAP. IX.

Of the Portugal Cheſnut, *commonly called the* Engliſh, *or eatable* Cheſnut; *its manner of raiſing for Timber, Underwood,* &c.

THE eatable Cheſnut, that is now propagated in *England*, was originally brought from *Portugal*, altho' Gardeners call it the *Engliſh* Cheſnut; but that proceeds from their want of being better inform'd, or otherwiſe to diſtinguiſh it from the Horſe-cheſnut, tho' a very improper Way: But ſuch Miſtakes in Gardeners, I hope, will be excuſed by the more learned.

THE difference between the *Portugal*, and Horſe-cheſnut is very much; for the Leaves of the *Portugal* are long and narrow, ſet on their Edges, with ſmall Thorn-like Subſtances: And thoſe of the Horſe-cheſnut are very large, divided into five (and ſometimes more) Sections, producing a very fine Shade, and agreeable Figure. Their Fruits are alſo different; but not ſo much as their Leaves, except in Taſte; the *Portugal*

Portugal being very ſweet and crisp, and the other hard, rough in the Mouth, and very diſagreeable.

THE *Portugal* Cheſnut is rais'd from its Nuts, which being gathered when ripe, about the end of *September*, or beginning of *October*, muſt, after they have laid ſome time to ſweat, as a Week or ten Days, be put into Sand, and therein kept, until the following Spring, at which Time they are to be planted in the places where they are to remain, (if poſſible, for they don't love to be often tranſplanted) or otherwiſe in Beds, as directed for the Acorns.

THE beſt Manner of planting them, is in the Bottom of deep Drills, at about one Foot apart, and not with Dibbers, as is uſual, which oftentimes cauſes their Miſcarriage: For when a Hole is made with a Dibber, and the Nut put in with the lower Part, from whence its Radicles ſhoot downwards: How is it poſſible for them to live, when there is a Hole beneath the Nut, of ſo great a Depth, as to be beyond the Reach of the tender Radicles, when they are endeavouring to ſtrike therein.

THEREFORE in planting them, Care muſt be taken to ſet the Point of each Kernel upright,

upright, and to preſs their lower Parts into the Earth; thereby to ſettle and fix it well about them.

THE Time that they ſhould remain in the Seed-bed, is one or two Years at moſt, according to their Strength and Size; after which Time, when you take them up, preſerve all their Roots with Abundance of Care, their tap Roots excepted, which are ever to be cut away; and if your Trees are deſigned for Walks, Avenues, *&c.* their often removing will be ſerviceable to them; but if you intend them for Timber, 'tis much the better Way to plant the Kernels where they are to remain, until fell'd for Timber.

THEY will thrive very well in moſt Kinds of Soils that are not over hot, or wet; but beſt of all in a freſh Sandy Loam, wherein they will, in a few Years, arrive to prodigious Magnitudes. They no more, than other Foreſt Trees, delight in being dunged, or anywiſe help by Compoſt, than what their own Leaves produce.

Mr. *Evelyn* adviſes, that if any Deſire to ſet them in Autumn or Winter, to plant them with their Husks on, to protect them from the Mice, during the Winter; but

ſince

ſince we may preſerve them with Safety, throughout the whole Winter in Sand, I can't ſee why we need run the Hazard of loſing our Kernels, by early planting. Indeed I muſt confeſs, that if we can by Traps ſecure our Seeds from Vermine throughout the Winter; 'tis much the better Way to plant them as ſoon as they are ripe, but not in their Husks: For if we do but obſerve *Nature herſelf*, we may ſee, that as ſoon as ever ſhe has ripen'd her Seeds, ſhe opens the Seed Veſſels, and commits them to the Earth, from whence they all ariſe at their natural Seaſons.

When Seeds of Trees are thus ſown, in their proper Beds, they are continually imbibing and naturalizing themſelves to the Juices of the Earth, whereby their Germination is perform'd more gradually, and with greater Strength, than when ſown out of a Bed of Sand in the Spring, whoſe Juices are contrary to the Soil that they are then planted in, which muſt undoubtedly be a very great Check to the putting forth of their Plumes and Radicles into the Air and Earth.

The beſt Seaſon to tranſplant the young Seedlings, is, in *October*, if the Weather is

is moiſt enough, or as ſoon after as poſſible.

In which obſerve, that you carefully preſerve their Leading Shoots, to prune away all their lateral Shoots cloſe to the Stem, and to preſerve and prune their Roots, as before directed.

When we are to plant them out in a Nurſery, to be afterwards tranſplanted into Walks, Avenues, *&c.* they muſt be planted, as directed in my *new Principles of Gardening*, but if we are to plant them out for good, in *Avenues, &c.* they ſhould be planted at twenty or thirty Feet aſunder, or rather forty or fifty, if their Planters could but have Patience; for the more Air circulates about a Plant, the better it thrives, by having a free Perſpiration, which Plants cannot have, when planted too near together.

I know a Cheſnut-tree now growing on the Lands of the late *Thomas Vernon*, Eſq; at *Twickenham* Park in *Middleſex*, whoſe Arms extend full fourſcore Feet, whereby we may eaſily know, at what Diſtances they ſhould be planted for ſuch rural Embelliſhments.

N. B.

N. B. The Cheſnut is an improper Tree to plant for Shade, in Meadows, to ſhelter Cattle from the Heat of the Summer, *&c.* For 'tis ſeldom that any Graſs will grow under its Shade.

The moſt agreeable Trees for this Purpoſe are the *Engliſh Elms*, whoſe Arms extending far from their Bodies, cauſe very agreeable Shades; and their Leaves being very ſmall, their Drip is moderate, ſo that the Graſs can grow very well underneath.

I ſhall now proceed to direct the raiſing and ordering this Tree, in the Coppice for Underwood, it being very advantageous, when ſo planted. In *February*, or rather *October*, when you ſow *Aſhen-keys*, *Acorns*, and *Hazel Nuts*, you muſt alſo ſet your *Cheſnuts* three or four together in Cluſters, at ſix or eight Inches a Part: Which Cluſters muſt be placed at twenty Feet diſtance in Rows, if you take the Pains to ſet them; or dropt in Parcels, at ſuch Diſtances, on the Land, when 'tis ploughed, before harrowing; and between them, in like Cluſters, as many Acorns, Aſhen-keys, and Hazel Nuts, at equal Diſtances, as before directed, in the Chapter on the *Aſh* for

Under-

Underwood; or if between the firſt and ſecond Furrow you firſt drop half a Dozen Acorns, then at about five Feet forward, half a Dozen Cheſnuts, after them, at the ſame Diſtance forward, half a Dozen Hazel Nuts, then half a Dozen Aſhen-keys; then begin again with the Acorns, then the Cheſnuts, afterwards the Hazel Nuts, and laſtly the Aſhen-keys; and ſo in like Manner drop the ſeveral Seeds, the whole Length of your Furrow. The firſt Furrow next the outſide of our new intended Coppice being thus ſown, meaſure off five Feet, and in a Furrow at that Diſtance, begin to drop the ſecond Row, obſerving to begin it with a Kind that differs from the firſt; as for Example, if the firſt Row ended with an Aſh, begin the next with an Oak, and ſo in like Manner continue, until the whole is ended; at which Time you muſt harrow the Ground the contrary Way that it was ploughed, which will bury the Seeds much better than to harrow it lengthways with the Furrows.

Thus would I adviſe the ſowing of Coppices, rather than to ſow them at Random, as I mention'd before in my Chapter on the Aſh. For by this Method there will be no

no Uncertainty of having them at their proper Diſtances, when they come to be boughed, which muſt happen (let Workmen be as careful as poſſible) when they are ſowed at Random, and afterwards ſingled out with the Hough: Beſides, 'tis ſoon done, and we are certain of a full Crop.

But when they are got about three or four Inches high, they muſt be thinn'd, leaving but one in a Place, which ſhould be thoſe that appear to be the ſtrongeſt and moſt healthy Plants.

N. B. If they are kept clean from Weeds, by Houghings, and the Earth ſtir'd about them by light Diggings, at the Beginning of every Winter, their extraordinary Growths will pay the Expence a Hundred Fold; for nothing adds ſo much to the Growth of Plants, as being kept clean, and the Earth often ſtir'd about them. A Copſe thus managed, will be fit to fell within eight or ten Years at longeſt, after ſowing, and yield great Plenty of Wood, fit for many Uſes.

When we fell Copſe Wood, we ſhould preſerve as many of the Oaks as poſſible, *viz.* at about forty Feet Diſtance from

one another, which being kept pruned cloſe to their Bodies when young, will ſhade the Under-wood but very little; and in Time produce fine Timber, of great Value.

If by any Accident our Plants ſhould fail, or by often cutting ſhould grow thin, we muſt thicken them, by laying down the laſt Year's Shoots of either Cheſnut, or Hazel; but of this more at large, when I come to ſpeak of the Management of Copſes.

The Time for the felling this Tree, either when 'tis become Timber, or Copſe-wood, is the ſame as for the Aſh or Elm. The Timber of this Tree has been formerly in very great Eſteem among Builders, for Girders, Joiſts and Rafters; and were it now as plenty in *England* as it has been, we need not be put to ſuch great Expences for Timber from *Norway* as we now are, but might finiſh our Buildings at as cheap Rates as our Forefathers did, when *England* gloried in its almoſt boundleſs Woods, of ſtately Timber Trees.

It mayn't be amiſs, if I ſpeak a Word or two in Relation to their Fruits, which are gather'd about the End of *September*,

when they begin to ripen, at which Time we ſhould gather, or rather beat them ſome ſmall Time before they naturally drop of themſelves; whereby they'll keep much longer, than when fully ripen'd upon the Tree.

THIS Fruit was formerly given to Swine, altho' it was then eſteem'd by Foreigners at a very high Rate: But now a-Days, we ſeem to have a greater Value for them, which is witneſs'd by the great Quantities roaſted every Winter in the Streets of *London*, and eaten by the Populace thereof. Mr. *Evelyn* tells us, in his Diſcourſe on this Tree, in Page 43 of his *Sylva*, that in *Italy* they boil them with Bacon, and eat them, as we do Beans; and alſo boil them in Wine, and then parch them a little. And in *France* and *Italy*, he further adds, that they roaſt them in Embers, (or rather parch them, I ſuppoſe, as our People do in *London*) and eat them with Salt and Wine, or Juice of Lemons and Sugar. And in *Virgil*'s Time, they eat them with Milk and Cheeſe.

THIS ingenious Gentleman does alſo recommend them for a very hearty Food for Country Husbandmen, being boil'd and

eaten with Bacon, inſtead of Cole, (I ſuppoſe Cabbage, or Coleworts): But in *England*, we value them for eating when parch'd or roaſted, as alſo with ſtew'd Meats, Pyes, *&c.* well known to our *Engliſh* and *French* Cooks.

THE beſt Method of preſerving them after gathering, is in dry earthen Veſſels, cloſe ſtop'd down from the Air, and kept in a dry, cool Place.

THERE's no Plant growing ſo fit, to plant in cold, open Lands, as this Cheſnut; for 'tis ſo prevalent againſt Cold, that where they ſtand, they defend other Plantations from the Injuries of the ſevereſt Winds and Froſts. And I am perſuaded, that if Plantations of this Kind were made along many of our Sea-Coaſts, where few or any Shrubs will live, there might be vaſt Improvements made thereby.

WHEN we make Plantations of Fruits in *England*, we ſhould at the ſame Time make Plantations of this Kind of Cheſnut, at ſome Diſtance from the Weſt, North, and Eaſt Parts thereof, to skreen them from the Cold, and Injuries of thoſe ſeveral Winds; and indeed, even every Houſe ſhould in the like Manner be defended from

thoſe Inſults: But before I conclude this Chapter, I muſt inform you, that if your Soil is very wet, ſo that the Roots ſtrike into Water, it gives the Fruits an inſipid watery Taſte, and renders the Timber unfit for Buildings.

N. B. That altho' the Timber hereof is very ſerviceable in many Kinds of Building, yet it muſt never be uſed in Warehouſes, Granaries, *&c.* where great Weights are laid; for 'tis of a ſomewhat brittle Nature, and will not ſupport great Weights; and tho' by cracking it will give timely Notice of its breaking, yet it muſt always be avoided in ſuch Structures.

N. B. Alſo, that the Aſhes, both of the Cheſnut and Aſh, being made into a Lee, will ſtain Linen very much. This I thought neceſſary to mention, to the good old Country Houſe-wife.

CHAP. X.

Of the raiſing and ordering the Horſe-Cheſnut-Tree, *for Avenues, Walks, Groves, Wilderneſſes*, &c.

THE Horſe-Cheſnut Tree was brought from *Conſtantinople* to *Vienna*, thence into *Italy*, and ſo into *France*; but I think that they were brought to *England* from the *Levant*. They are raiſed from their Nuts, which ripen and fall in *September*, which is the Seaſon for their ſowing; but if your Ground is not then ready, you may keep them in Sand until it is.

THEY are ſown in Drills, made about ſix Inches deep, and a Foot aſunder, drop'd, or rather plac'd, as directed for the *Portugal* Cheſnut, at about one Foot apart.

THEY muſt remain in thoſe Drills, before they are tranſplanted into the Nurſery, at leaſt two Years, at which Time their leading Shoots, or Tops, and their lateral or horizontal Roots ſhould be preſerved; but their Tap Roots muſt be prun'd away entirely.

THE

THE beſt Time to tranſplant them, is *October* or *November*. If you tranſplant them into a Nurſery, to be afterwards remov'd, you muſt plant them in Rows, about two Feet apart, and the Rows four Feet aſunder.

THE Reaſon why I adviſe this thin Planting, is, That as 'tis a Tree of a quick Growth, it therefore follows, that it requires a free circulating Air, to perſpire away the crude watry Part of its Sap, of which it is always imbibing great Quantities; for 'tis always ſeen, when Trees have a ſufficient Quantity of open Air, circulating about them, that they are of a much ſtronger and quicker Growth, than thoſe that are thick and cloſe planted; for Plants are as eaſily ſtifled for Want of Air, when too cloſe planted, as human Bodies, when too great a Number are confin'd in a ſmall Room: But I need not to have given my ſelf this Trouble, ſince I have already by many Inſtances prov'd the Neceſſity of a free drying Air, for the Perſpiration of Vegetables in general; which are ſufficient Proofs of the Neceſſity of thin Planting.

IN this State they are to remain in the Nurſery for three Years, keeping them diſ-

budded every Spring of their lateral Buds, and houghed clean from Weeds, which, if ſuffer'd to grow, will be a great Hindrance to their Growth; and digged once a Year, ſoon after the Fall of their Leaves.

At three Years End, they will be greatly advanc'd, and if your Land is not then ready to tranſplant them in for good, you muſt take them up, and replant them again in the ſame Places, taking Care not to bruiſe their Roots, as little as poſſible, and to prune all their Ends with a very ſharp Knife.

This Removal and Pruning will cauſe them to ſtrike freſh Roots, whereby they will become very well rooted, and fit to tranſplant at any Time hereafter; but if your Land is ready to plant them into Avenues, Walks, Groves, *&c.* Then plant them at forty Feet aſunder, or more, as fifty or ſixty Feet, if your Avenues are very long and ſpacious. But Avenues that are of a ſhort Length, may be planted, at thirty or thirty five Feet apart, and ſingle Walks at fifteen, twenty, or twenty five Feet.

Groves and Wilderneſſes being parts of a Garden, more for the Pleaſure of Shade, than Profit of Timber, may therefore be

planted

planted ſomething thicker, eſpecially where their Shade is required immediately: And in ſuch Caſes the Diſtance of eight, ten, twelve, or fifteen Feet, may be allowed. And when you plant a Grove on Purpoſe for Shade, you may be allowed to cut off the Heads of your Plants, which will cauſe them to ſpread very much; but this Work ſhould be never practiſed in any other Plantations, as in Avenues, Walks, *&c.* where the leading Shoot carries on the Height of the Tree, which is both graceful and advantageous.

The Heads of your Cheſnuts ſo cut, ſhould be cover'd over with Bees-wax and Mutton Suet, to preſerve their Bodies from imbibing Rains, *&c.* that are very often their Deſtruction. And ſince I am now got into the Grove, I muſt give you a Word or two of Advice therein, as to their Manner of planting, which ſhould always be after Nature's own Rule, by placing them in an irregular Manner, and not ranging every Way like Apple or Cherry Trees in an Orchard.

The Care that is required in the Management of theſe Trees, after they are planted out in Avenues, Groves, *&c.* is to

ſecure

ſecure them from being diſturb'd in their Roots, by Winds, to keep them moiſt in the Spring, after planting, as alſo the Summer afterwards, if they prove dry. And the next Spring following, prune off the leading Shoot of every Branch, juſt as they are going to break into Leaf, which muſt be done again, for three Springs next after. The Reaſon of their being thus ſtop'd, is to ſtrengthen them, near to their Bodies, whereby they are leſs liable to be broken by violent Winds, which they are ſubject to, when permitted to ſhoot out very long jointed Arms at their firſt planting: For the oftner a Branch is ſtopt at its leading Bud, the thicker and cloſer jointed it grows, and conſequently ſtronger; and therefore the better able (as being very brittle Wood) to reſiſt the Violence of the Winds, which oftentimes for Want of their being ſo ordered, ruins many a noble Tree.

When this Tree is planted at a ſufficient Diſtance from others, ſo as to enjoy a free Air, it will produce great Plenty of Beautiful Flowers in the Spring, that make a graceful (or rather as Mr. *Evelyn* ſays) a glorious Appearance, ſuperior to all other Foreſt-trees at that Time; therefore that

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we may not deprive ourſelves of this Beauty, let their Diſtances in Avenues, Groves, *&c.* be rather thinner than the aforeſaid Diſtance; or otherwiſe when their Heads begin to meet, cauſe them to be reduced, both in Length and Number, to let in a free drying Air, which will cauſe them to ſhoot afreſh, and produce Flowers in great Plenty.

Sometimes in large Gardens we make Hedges of this Kind of Plant; And I do aſſure you, that there is none more beautiful, if they are skilfully order'd.

Most other Hedge-Plants will bear the Sheers to clip them at any Time, but this will not. Theſe muſt be pruned with a Knife, cutting them in every Year, to the inward Buds, which the next Spring will ſhoot forth, and produce great Plenty of Flowers.

The Seaſon for pruning them, is the Spring, juſt before they break into Leaf; for then the Sap being in Motion, and the Weather warm, their Wounds are ſoon healed.

If you prune them in the Winter, they will imbibe Cold, Rains, *&c.* that are prejudicial; and ſince that the Trou-

ble

ble and Expence are the ſame, I can't ſee why they may not be prun'd in the Spring, when all the Froſts and cold Rains are over; but if you had rather prune them at another Seaſon, when your Buſineſs is not ſo much upon your Hands as 'tis in the Spring, and can't ſo well ſpare Time, you may perform the ſame in *September*, when their Nuts are fallen, and have almoſt done growing; for then their Wounds will be healed before the Winter comes on.

N. B. THAT altho' Hedges of Horſe-Cheſnuts are very beautiful, both in Leaf, Flowers, and Fruits; yet they are not to be planted in ſmall Gardens; for notwithſtanding their annual Prunings, they will gather and cover a great deal of Ground, as four or five Feet in Breadth, which ſmall Gardens can't well ſpare.

N. B. THAT the aforeſaid Breadth of four or five Feet ſhould be allowed for at their Planting, or otherwiſe the Walks will become too narrow, as they advance in Growth.

THE Diſtance they ſhould be planted at in the Hedge-lines, is three or four Feet; and as their Branches are produced every Spring, you muſt nip off the leading Bud of each,

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(the upright one excepted) which will cauſe them to grow thick and handſome in a ſhort time.

THUS have I given you a full Account of the Culture of this noble Tree, which tho' a very quick Grower, and generally of a large Stature, yet is not above the Imploy of an Eſpalier, to encloſe our Orangeries, Fruit Gardens, *&c.* to protect them from the Inſults, and Injuries of Winds, *&c.*

CHAP. XI.

Of the Perſpiration of the Wallnut-Tree, *its Manner of raiſing for Timber,* &c.

THE Kinds of Wallnut Trees that we have in *England* are two, the one a very large Kind called the *French* Wallnut, and the other a leſſer, called the *Engliſh* Wallnut.

OF theſe Kinds, the beſt for the Table is the *Engliſh*, its Kernels being much ſweeter, firmer, and fuller, and Shell very thin; whereas the other, tho' very large, yet its Kernel is very ſmall, in Reſpect to its

its Size, and of a very watry Flavour; nay, ſometimes a Jelly only, and the Shell of a great Thickneſs: And indeed, ſome of the *Engliſh* Kinds have very thick Shells, and very ſmall alſo; but their Kernels are for the generality very firm and good, tho' difficult to get at. The beſt Kinds of Wallnuts, are thoſe whoſe Shells are very thin, and eaſy to crack, of a middling Size, that grow in a dry rich Loam, and enjoy a freſh drying Air in all their Parts.

But altho' the *French* Wallnut is the leaſt valuable for the Table, yet 'tis excellent for Pickling; and the Tree produces fine Timber in a few Years, that is of great Value to Cabinet-makers, *&c.* for inlaying of Tables, Chairs, Looking-glaſs Frames, *&c.* This Kind of Wallnut is very plenty in *Virginia*, as well as in *France*; and 'tis a great pity that we don't propagate them in every Eſtate, where the Soil is natural to them, ſince they will proſper as well with us, as they do in their own native Country. At *Twickenham* Park in *Middleſex*, are divers planted, by that late Encourager of Planting and Gardening, the honourable *Thomas Vernon*, deceaſed, that are arriv'd to very great Statures in leſs than thirty Years from the Nuts.

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THESE Kinds of Trees are propagated from their Nuts, which are to be planted as ſoon as ripe, or kept in Sand till the *March* following, and then planted out, as directed for the Cheſnuts: But plant them when you will, great Care muſt be taken to preſerve them from Mice, and other Vermin, leſt they diſappoint you of Succeſs.

MR. *Evelyn* adviſes, that they be planted with their green Husks on, with Strewings of Furze cut ſmall, to prevent their Acceſs thereto; but if ſeveral Traps are ſet, whoſe making and ſetting are well known to Gardeners, they may be kept ſecure from them, without any kind of Danger.

MR. *Evelyn* recommends their being ſteep'd in Milk before they are planted; but if they are kept from the Air in Sand after gathering, or planted as ſoon as gather'd, according to Nature's own Method, they will thrive very well, and produce ſtrong and healthy Plants: And here obſerve, that if 'tis poſſible, you muſt plant the Nut where 'tis deſign'd to remain, rather than to be ſown in a Seed-bed, (as before directed) and afterwards tranſplanted into a Nurſery for ſome Time, before they are planted out for good.

BOTH

Both Kinds of Wallnuts thrive beſt in moderate, dry, rich Soils; and Mr. *Evelyn* ſays, eſpecially if it incline to a feeding Chalk or Marle, where 'tis protected from the Cold, though it affect Cold, rather than extream Heat, as in large Pits, Vallies, &c. nay, even in ſtony Grounds, and on Hills.

If we plant entire Woods of them, they ſhould be at fifty or ſixty Feet Diſtance; but in Meadows, Corn-fields, &c. a hundred Feet is near enough. Mr. *Evelyn* reports, that in *Burgundy*, where they abound, they are planted in their beſt Wheat Lands, at ſixty Feet, and an hundred Feet apart; nor do they injure their Crops, but rather keep them warm: In ſhort, this Tree is of ſo great a Value in that Country, that when ever they fell an old or full grown Tree, they always plant another near thereto; ſo that their Number is never diminiſhed: And had the People of *England* obſerved the ſame Rule, of planting an Acorn when they felled an Oak, we might have had a continual Supply of Timber for our civil and naval Uſes, which 'tis to be fear'd, we ſhall ſtand in very great need of, before ſixty Years more are ended, if a timely Proviſion is not made, and that very ſpeedily.

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And ſince that the Strength and Glory of this Nation depends on our Ships of War and Commerce, what a Condition ſhall we be in, when our Woods are exhauſted of their Timber, and we become oblig'd to other Nations for Timber to build our Ships with?

This being well conſider'd, is ſufficient to induce every *Britiſh* Subject to ſpeedy Plantations of Timber Trees in general, and more eſpecially, ſince that thereby they not only enable themſelves with proper Materials for Defence, *&c.* but their Eſtates are vaſtly improv'd, to the great Advantages of themſelves, and their Poſterity after them.

In the Management of Wallnut Trees, we are to obſerve, firſt to preſerve their leading Shoots at all Times; ſecondly, to diſplace their lateral Buds, as they appear in the Spring; and laſtly, to preſerve them from being injured by Cattle and Weeds whilſt young.

These Trees are very proper for Avenues, Walks, *&c.* being planted at forty or fifty Feet diſtance in Lines, and the Lines double that diſtance from each other.

Mr. *Evelyn* makes mention in his *Sylva*, *Page* 54. that the *Bergſtas*, (which extends from *Heidelberg* to *Darmſtadt*) is all planted with Wallnuts, chiefly for their Ornament and Shade; ſo as a Man may ride for many Miles about that Country under a continued Shade or Arbour, which in hot Seaſons muſt undoubtedly be very refreſhing to the Traveller, as well as diverting, when their Fruits are ripe. Now could we but once entertain ſuch noble Spirits within us, how vaſtly it would improve the Glory and Wealth of the Nation in general? That glorious Deſign (mention'd by Mr. *Evelyn*, in his following *Page* 55.) in *Henry* the Fourth's Time, of planting all the Highways of *France* with Elms, would have enrich'd and ſtrength'd that Nation to a very great Degree, had not the rude and miſchievous *Peaſants* deſtroy'd their firſt Plantations, which cauſed the thorough Proſecution of the Deſign to be ſtopt, whereby the Roads of *France* continu'd naked. But had that Deſign been then executed, what a glorious Country would *France* have been by this Time? Its own Hedge-rows, by the Way-Sides, would have produc'd ſuch immenſe Quantities of valuable Tim-

ber for building of Ships, Forts, Caſtles, *&c.* that would have greatly added to the Strength and Wealth of that Nation. And ſince that the *Britiſh* Soils are as fertile as any in Chriſtendom, we might, were we to plant our Hedge-rows in like Manner, ſoon arrive to the ſame, if not a greater Glory therein, and at little or no Expence in the Operation.

The Smell of theſe Kinds of Trees is diſagreeable to many, and ſo is the Smell of Violets, Pinks and Roſes, which to the general Part of Mankind are delightful: But in *Ireland*, they are chiefly propagated for the agreeable Smell of their Leaves.

Indeed, when their Leaves fall in the Autumn, and putrify on the Ground, they do emit a Steam, which is diſagreeable to many; but 'tis ſoon over, and therefore not worth our Notice. Mr. *Evelyn* reports, that the Juice of the fallen Leaves is obnoxious to their Roots; but for my Part, I cannot ſay any thing thereof: But this I know, that the Husks and Leaves being infus'd in warm Water, will deſtroy Worms in Graſs-plots and Gravel-walks. And Mr. *Evelyn* ſays, that the Water of their Husks is ſovereign againſt all peſtilential Infecti-

ons, and that of the Leaves, to cleanſe and heal inveterate Ulcers. The green Husks or outward Shells being boil'd, make a very good dark yellow Dye, without any Mixture; and 'tis with this, that thoſe Vagabonds, vulgarly call'd Gypſies, diſcolour their Skins, in Imitation of *Ægyptians*. 'Tis further added, by the aforeſaid Gentleman, that their Leaves being diſtilled with Honey and Urine, and apply'd, cauſes Hair to grow in bald Places; which if true, would be very ſerviceable to Horſe Dealers, who have Horſes on their Hands, whoſe Knees are broken and batter'd by Falls, *&c.* and want Hair, to conceal thoſe Faults from their Chaps.

THEIR Kernels produce a fine Oil, which in *Italy* is drank by the Country People when they are afflicted with Pains in their Sides, and gives them immediate Eaſe. Mr. *Evelyn* ſays, that one Buſhel of Nuts will produce between ſeven or eight Pints of Oil, which the ſooner 'tis drawn, is the more in Quantity; but the drier the Nut is, the better in Quality.

THE beſt Method of keeping Wallnuts, is to gather them when they are full ripe, in a dry Day; after which let them lye a Day

Day or two in a dry Place, being clean'd of their Husks, and rub'd very dry. Then put them into leaden Pots cover'd over, and bury them in the Ground, where the Rains or Wet cannot get at them, and they will keep the whole Year about.

When you have not the Conveniency of leaden Pots to preſerve them in, or ſhould by Neglect ſuffer them to be very dry, and their Kernels ſhrivel'd, you muſt infuſe their Kernels in very warm (but not ſcalding hot) Water, which will in a ſhort Time cauſe them to ſwell as large as when firſt gathered, and their Taſte be nearly the ſame.

It is the Opinion of many, that theſe Sort of Trees thrive much better, when their Nuts are beaten off, then when gathered. But 'tis a Miſtake, for inſtead of thriving better, they thrive leſs; but they are abundantly more fertile. This Fertility is cauſed by the ſeveral Wounds and Bruiſes that they receive in their Bark when thraſhed, that hinder the Sap's free Paſſage; whereby 'tis much ſooner inſpiſſated into a glutinous Subſtance, fit for new Productions; then when the Sap Veſſels are whole

and entire, and abounds with a greater Plenty of freſh crude Sap.

In *Italy*, they drive the Tops of their Poles that they thraſh them with full of Nails, and Stubs of Iron, on purpoſe to gaul and break off the Bark, in thraſhing off the Fruits; which they believe to be an Improvement to their Trees.

Mr. *Evelyn*, in his 55*th Page* of his *Sylva*, ſays, that a curious Friend of his obſerved, that the Sap of this Tree aſcends and deſcends with the Sun's diurnal Courſe, (which it viſibly ſlackens in the Night) and more plentifully at the Root, on the South Side, than on the North Side, notwithſtanding that thoſe Roots on the North Side were much larger.

By many of the preceding Experiments, I have proved, that Vegetables perſpire moſt in the Day Time, and that proportionably to the Heat and Moiſture of the Weather. I have alſo proved by the foregoing, that 'tis the Heat of the Morning that rarifies the Sap, and prepares it fit for Perſpiration; and that when the Cool of the Evening advances, the Sap is thereby condenſed in its Veſſels, whereby it recedes towards the Roots; and at the ſame Time, to ſupply the

the Place of the rarified Sap, the Dews of the Night, and the Air alſo, are freely imbibed by the Vegetable: So that what Mr. *Evelyn*'s Friend obſerved, on the riſing and falling of the Sap diurnally, was no more than the Beginning and Ending of its diurnal Perſpirations, and imbibing Force, when 'twas by the Cool of the Evening changed from a perſpiring, to an imbibing State, & *contra*. And the Cauſe of the Sap's being in a greater Motion on the South Side, than on the North Side, proceeded from the different Degrees of Heat, that the South Side was expoſed to, more than the North Side; for the greateſt Heat demands the greateſt Supply of Moiſture to ſupport the Perſpiration of that Part of the Plant, and for want thereof, it often periſhes. Now ſeeing that Plants perſpire away their Sap, in all their ſeveral Parts, with Velocities equal to the ſeveral Expoſitions of their Parts; it therefore follows, that the North Part of Plants that are leaſt expoſed to the Sun, imbibe Moiſture with a leſs Velocity than thoſe of the South, which conſequently cauſes their Growths to differ very much. But if the Sap of Vegetables did circulate, as Blood does in Animals, then by its Cir-

culation, the South Part of the Vegetable would be aſſiſted by the Sap from the North Side, and conſequently the Sap in the South Side would aſcend with a Velocity equal to that of the North, *&c.* which it does not do: But more of this when I come to prove the Non-circulation of Sap.

THE Uſes that we might apply this Beautiful Timber too, had we great Penty thereof, are almoſt endleſs. 'Tis now of great Uſe to the Gun-ſmith, to the Cabinet-maker, to the Joiner, *&c.* and had we Plenty thereof, we might wainſcot our Rooms, after the beautiful Orders of Architecture, which would ſurpaſs all other Wainſcoting whatever; and more eſpecially, if 'twas judiciouſly mix'd with Cedar, Ebony, Manſhaneel, Mohoggony, *&c.* its Surface being very beautiful when poliſh'd.

THE Manner of preparing this Timber for poliſhing, is to ſet it in a very dry Place, to be well dry'd before you work it, for it will ſhrink very much. Some Joiners will put it in an Oven, after the Bread is drawn out, for ſeveral Times, one after another, until it become very dry; others will place it in a dry Houſe, and keep it a Year or

two

two before they work it, which I take to be much the beſt Way. However, uſe it which Way you will, it muſt be very well dry'd before 'tis work'd: And when 'tis work'd into its deſign'd Form, then they poliſh it over with its own Oil very hot, which gives it a pleaſant ſhining Black, that is very beautiful.

THE moſt valuable Part of this Tree, is the very Heart or inward Parts thereof, both of Body and Roots; ſo that when theſe Trees are fell'd, great Care ſhould be taken to preſerve their large Roots, for 'tis oftentimes ſeen, that their Roots only are of greater Value, than all their Body and Branches together. But when theſe Trees are ſuffered to grow very old, as forty or fifty Years, 'tis very rare, that their Bodies ever fail of having a very beautiful Grain in their Hearts, which are the only Parts that are valuable to the Cabinet Maker.

THEIR Sap is uſeful for making of Gun-Stock, Chairs, Table-Frames, and other like Uſes.

THESE Kind of Trees are ſold by the Foot ſolid, as other Timber, but the Price is as uncertain, as the Quantity of Heart happens to be more or leſs. I have known

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a Wallnut Tree, that contain'd about fifty ſolid Feet of Timber, whoſe Heart was very good, ſold for twenty Pounds to a Timber Merchant, and afterwards to a Cabinet-maker, who undoubtedly had a Profit therein. And I have known others much larger, whoſe Hearts were very inconſiderable, ſold for an eighth Part of the Money, at one Shilling *per* Foot; and at that very low Price they are as valuable to an Eſtate as Oak, Elm, *&c.* But when they happen to be of a fine Grain, and have good Store thereof, they are of an unknown Value.

I have ſeen ſome Aſhen Trees, which have been full of large Knots, that were very beautiful in their Grains, and of great Value to the Cabinet Maker, but they are always accidental.

Beech is oftentimes very beautiful in its Grain, and therefore is uſed by Cabinet-Makers for inlaying; and very often, they by waſhing it over with a Decoction of the green Husks of Wallnuts, ſell it for Wallnut-Tree to thoſe who are unacquainted therewith.

This Kind of Wood is of a very brittle Nature, and therefore muſt not be uſed

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in Buildings, for Girders, Joiſts, Rafters, *&c.*

The Seaſon to fell this Tree, is *December*, at which Time they ſhould be carefully grub'd, and not ſaw'd off at their Butts, as other Timber Trees are, except that the Buyer conſents thereto.

Chap. XII.

Of the Perſpiration of the Lime-Tree, *its Manner of raiſing, and planting in Avenues, Walks, Wilderneſſes, Groves,* &c. *and in Parks, Woods,* &c. *for Timber.*

The *Lime-Tree* is alſo called the *Linden-Tree*, of which there are two Kinds, the Male and the Female; the Male is of a ſlower Growth than the Female, its Leaves very ſmall, ſomewhat like an Elm, but a harder Wood, very full of Knots, and a reddiſh Green. The Female Kind is of a much quicker Growth, producing Leaves of a much larger Size, and odoriferous Bloſſoms in the Spring, that perfume the Air, and ſupport the induſtrious Bee with great Plenty of Food. About 70 Years ago

ago we receiv'd this Kind of Tree from *Flanders* and *Holland*, notwithſtanding that, at the very ſame Time, our own Woods produc'd them ſpontaneouſly; ſuch has been our Folly, to value the Product of foreign Countries, and to neglect that of our own, which in many Reſpects is vaſtly ſuperior to them!

Both theſe Kinds are raiſed from Seed, or by Layers and Suckers, ſlipped off from the Roots of the old Trees. The Soil that they delight in, is a rich moiſt Loam, with a ſtrong holding Bottom; but not a Clay, which is of too cold and wet a Nature, that chills and rots their Roots; and on the contrary, a Sand is of too hot and dry a Nature, which ſtarves their Roots. And ſome Loams that are of a ſandy or gravelly dry Nature, are alſo too hot, cauſing them to ſhoot out very early in the *Spring*, and to drop their Leaves, or turn yellow about *Midſummer*, whereby their Beauty is ſoon over.

Their Seeds are ripe, and fit for gathering about the End of *October* or the Beginning of *November*, at which Time they may be ſown in a Seed-Bed as Heithorns, or preſerv'd in Sand until the *February* following, and

and then ſowed in Beds, as before directed, wherein they muſt remain two Years; after which tranſplant them into a Nurſery, as directed for the *Engliſh* Elm. But if you increaſe them by Layers, the uſual Seaſon to lay them down is *February*; but I muſt confeſs, that the Fall of the Leaf is much the better Time; for when their tender Shoots are laid in the Earth ſo very early, they have a much longer Time to imbibe the Juices thereof, and prepare themſelves to ſtrike Roots with much greater Vigour, than when laid down in *February*, and oftentimes attended with dry Weather in the *March* following.

THEIR Diſtances that they ſhould be planted at, in grand Avenues, Walks, Groves, *&c.* is from thirty five to forty Feet, but in Avenues, that are leſs noble, they may be at thirty, twenty five, or twenty Feet. And in ſingle Walks in a Wilderneſs, at ſixteen Feet, in Groves at ten or twelve.

THESE Trees make very beautiful cloſe Hedges, and very ſoon, being planted at about five or ſix Feet apart, or nearer, if 'tis required, to make a full Hedge at once. At which Time 'tis beſt to plant Plants of two

two Sizes, the one very low, to thicken at the Bottom, and the other ſomething taller. But obſerve, to reduce their Heads proportionably to their Quantity of Roots, as directed in the preceding Lectures: To cut away all the capillary Roots that they are attended with, which being generally very much matted together, prevent the Earth from cloſing to their fibrous Roots, and thereby often periſh: To cloſe the Earth very carefully about every Root, to prune them with a ſharp Knife, to cut away all Parts bruiſed by the Spade in taking up, and to plant them as ſoon as poſſible, after being taken out of the Nurſery. The beſt Sizes are thoſe about two or three Inches Diameter; or if they are larger as four or five Inches, they will do very well, provided that they are well rooted. I have planted Trees of this Kind, and of *Engliſh* Elms alſo, that have been eighteen Inches Diameter at their Butts, that have thriv'd very well.

The Seaſon to plant this Tree is, at the general Fall of the Leaf, in *October* or *November*, at which Time you muſt ſecure them from the Injuries of Winds, Beaſts, and worſer Creatures, that take Pleaſure in de-

deſtroying young Plantations. Their Bark is eaſily cut, by Boys in Play; and therefore, as they are our chief Ornaments for Eſpaliers, or Skreens before our Doors, to protect us from the Sun, Duſt, Winds, *&c.* we ſhould, whilſt they are young, defend them, by large Trunks, placed at ſuch Diſtances, as to admit the Air's free Circulation, and their Bodies to dilate.

The Shoots of this Tree are of a beautiful Red, and very pliable, ſo as to cover Arbours, ſhady Walks, *&c.* in a ſhort Time, that produce a very pleaſant and agreeable Shade. And Mr. *Evelyn* ſays, That the ſweet Odour of their Bloſſoms, is admirably prevalent againſt the Epilepſy, that is the falling Sickneſs; and therefore recommends their being planted before every one's Door, as well in the City as Country; and were the broad Streets of *London*, as the *Hay-market*, *Pell-mell*, *Strand*, *Fleet-ſtreet*, *Holbourn*, *Cheapſide*, &c. planted with theſe Trees, at about eight Feet Diſtance from the Houſes, on the inward Edges of the Kennels, and kept neatly cut in Eſpaliers, or Pyraments, nothing would be more delightful and entertaining; Then might we view a City in a Wood.

Stat

Stat Philyra; *haud omnes formoſior altera ſurgit*
Inter Hamadryades; *Molliſſima, candida, lævis,*
Et viridante comâ, & bene olenti flore ſuperba,
Spargit odoratam latè atque æqualiter umbram.
Coulei L. 6. Pl.

The ſtately Lime, ſmooth, gentle, ſtreight, and fair,
(With which no other Dryad may compare)
With verdant Locks, and fragrant Bloſſoms deckt,
Does a large, ev'n, odorate Shade project.

The Timber of this Tree, is vaſtly uſeful to the Carver, Cabinet-maker, Heel-maker, *&c.* and therefore in ſome proper Part of our Lands, we ſhould make Plantations thereof, excluſive of Avenues, Walks, *&c.* for felling, when arriv'd to a ſufficient Stature, which between thirty and forty Years never fail to produce.

CHAP. XIII.

Of the Perſpiration of the Service Tree, *its Manner of raiſing and planting in Avenues, Walks, Groves, Paſtures,* &c.

WE have two Kinds of *Service* in *England*, the one called *Torminalis*, which is that as is moſt frequent among us; and the other, that bears its Fruits ſomething like a very ſmall Pear, very plentiful in *France*, where 'tis called *Cormier*: Whoſe Leaves are narrower, and leſs indented.

THESE Kinds of Trees are raiſed from their Seed, or Suckers.

THEIR Seeds are ripe in *October*, at which Time, mixing them with dry Sand, rub off their Pulps; and afterwards being dried in the Sun, keep them in Sand until the Spring following, and then ſow them in Seed-beds, as directed for the Beech-Maſt in the preceding Lectures. They ſhould remain in the Seed-beds for the Space of two Years, during all which Time, you

muſt be ſure to keep them clean from Weeds, and moiſten'd in very hot and dry Seaſons.

THE Soil that they delight to grow in, is a good ſtrong Loam, rather cold than hot. The Diſtances that they ſhould be planted at in the Nurſery, is the ſame (and in the ſame Manner) as directed for the Wallnut, and other Trees, in the preceding Chapters.

THESE Trees do oftentimes arrive to great Statures, and therefore may be planted in Avenues, Walks, &c. as the Lime, *Platanus*, &c. or in Woods for their Timber, which is of very great Value to the Joiner, to the Engraver, to the Gunſmith, to the Turner, and even to the Mill-wrights, and Carpenters. 'Tis a Wood of a very great Duration, and being rubb'd over with Linſeed Oil, looks very beautiful. 'Tis of a very fine Grain, and with Staining, may be made to counterfeit Ebony, and many other curious Woods.

THE Fruits are ripe in *October*, but they are gathered in the End of *September*, when the Weather is dry, or otherwiſe they are apt to grow mouldy, before they are eatable, which is when they are (as it were) rotten, like unto Medlars.

THIS

THIS Tree affords a very agreeable Shelter to Cattle, and does very little Hurt to the Graſs that grows under its Drip; ſo that we may plant them in our Paſture Grounds, to their very great Improvement.

THE Diſtances that they ſhould be planted at in Paſture Grounds, is about fifty or ſixty Feet from each other; and if they are planted out when young, and kept clean from Weeds, and moiſt in very dry Seaſons, they will arrive to very large Statures in a few Years Time; for when Trees are planted out young, and have a free circulating Air about them, ſo as to perſpire freely, they never fail of Succeſs, provided that the Soil is natural to them, and they are under the Government of a judicious and careful Guardian.

THESE Fruits may be improved by Budding or Grafting; and indeed 'tis much the beſt Way; for Nature is as wanton in theſe Productions, as in others; and 'tis very rarely that we have a Fruit raiſed from the Seed, ſo good as the Mother Plant. Indeed 'tis ſometimes found, that from Seedlings we have ſome Kinds that are much better; but 'tis very rarely that it happens ſo. Therefore that we may not be

deceived by their degenerating Qualities, 'tis beſt to bud, or graft all thoſe Trees that we deſign to propagate for their Fruits, with Kinds that we know to be good; which will cauſe them to produce Fruits very early, and in great Abundance.

CHAP. XIV.

Of the Perſpiration of the Maple Tree: *Its Manner of raiſing in Woods, Wilderneſſes, Avenues, Walks, Hedges,* &c.

THE Kinds of Maple that we have in *England* are many; but the moſt valuable are the *French* Maple, and the Peacocks Tail Mapple; which laſt is that Kind ſo elegantly undulated, and turned into Variety of Curls. Theſe Kinds are very beautiful in their Leaves, and were by the Ancients eſteem'd at a very high Rate.

THEY are all propagated from their Keys, in the very ſame Manner as the Aſh, or by Suckers or Layers: And the Soil that they delight in, is a ſound and dryiſh Loam, and therefore they are very proper for deep dry Lands, or Banks.

THEIR

THEIR Keys remain in the Seed-bed, until the ſecond Spring; at which Time, if they are kept clean from Weeds, they will come up very ſtrongly, and become good Plants in a ſhort Time, being tranſplanted therefrom, at the End of two Years, into a Nurſery, as directed for Elms, Limes, *&c.*

THESE Sorts of Maple make good Hedges in a Garden, Wilderneſs, *&c.* where nothing elſe will live. They alſo thrive exceedingly under the Drip of any Sort of Tree whatever; and therefore are a very good Furniture for the Quarters and Hedges of a Wilderneſs. But there are few or any Trees or Shrubs care to grow under their Drip, or rather can live under their Shade; for they being of a very ſtrong, attracting, ravenous Nature, ſomething like the Aſh, draw away the greateſt Part of the Moiſture, and ſtarve the other Plants, eſpecially thoſe, whoſe Roots run ſhallow. But Foreſt Trees, whoſe Roots are deeper than theirs, are not injured thereby.

IF we plant theſe Trees in Woods, and keep them dreſſed to ſtreight Bodies, they will ſoon become very large, and valuable to their Owners.

THE Timber of theſe Trees, is of greater Value than Beech or Elm to Joiners, for the inlayings of Floors, Sounding-boards, Pannelling, &c. And eſpecially when its Knots are delicately diapred.

'TIS alſo of very great Service for many other Uſes, as Knife-Handles, Cups, Muſical Inſtruments, &c.

Pliny ſeems to value the Maple at a very high Rate, as may be ſeen by his Report thereof, as following.

Acer Operum elegantiâ & ſubtilitate Cedro ſecundum; plura ejus genera: Album, quod præcipui candoris vocatur Gallicum.

In Tranſpadanâ Italiâ, tranſque Alpes naſcens. Alterum genus criſpo maculârum diſcurſu, qui cùm excellentior fuit à ſimilitudine caudæ pavonum nomen accepit.

'THE Maple, for the Elegancy and Fineneſs of the Wood, is next to the Cedar 'it ſelf: There are ſeveral Kinds of it, eſpecially the White, which is wonderfully 'beautiful: This is called the *French* Maple, and grows on that Part of *Italy*, 'that is on the other Side of the *Po* beyond the *Alps*: The other has a curled 'Grain, ſo curiouſly maculated, that from

'a

'a near Reſemblance, it was uſually called 'the Peacock's Tail, *&c.*

BESIDES theſe two Kinds, *Pliny* makes mention of two others, in his ſixteenth Book, Chap. xvi. The one he calls the *Bruſcum* Maple, and the other the *Molluſcum*.

HIS Account thereof is as followeth.

Pulcherrimum verò eſt Bruſcum *multoque excellentius, etiamnum* Molluſcum *tuber utrumque arboris ejus* Bruſcum *intortiùs criſpum.* Molluſcum *ſimplicius ſparſum; & ſi Magnitudinem menſarum caperet, haud dubiè præferreter Cedro, nunc intrà pugillares, lectoriúmque filicios aut laminas*, &c. *& Bruſco fiunt menſæ nigreſcentes.*

'THE *Bruſcum* or *Knur* is wonderful fair, 'but the *Molluſcum* is accounted more 'precious; both of them producing Knobs, 'or Swellings out of the Tree. The *Bruſ-* 'cum is more intricately criſped; the *Mol-* 'luſcum not ſo much; and had we Trees 'large enough to ſaw into Planks for Ta- 'bles, 'twould be preferred before *Cedar* 'or *Citron*, (for ſo ſome Copies read it) but 'now they uſe it only for ſmall Table Books, 'and with its thin Boards to wainſcot Bed- 'Teſters, *&c.* The *Bruſcum* is of a blackiſh

'Kind, with which they make Tables. Thus far our antient *Italian* Author.

Mr. *Evelyn* reports, that *Cicero* paid ten thouſand Seſterces for one Table of this Wood, and that King *Juba*, fifteen thouſand. And that he has read of another that was valued at 14000 H. S. which at about three Pence Sterling each, amounts to 1750 Pounds; and yet that of the *Mauritanian Ptolomie*, that was four Feet and half Diameter, and three Inches in Thickneſs, was far richer, which is reported to be ſold for its Weight in Gold. 'Of that 'Value they were, and ſo madly luxurious 'the Age, that when they at any Time re-'proached their Wives, for their wanton 'Expenſiveneſs in Pearl, and other rich Tri-'fles, they were wont to retort, and turn 'the Tables upon their Husbands.

These Trees will undoubtedly arrive to very large Statures, if they are well managed, as before directed, and not made Pollards, by the loſs of their Heads, which ſpoils Timber Trees in general.

And if we obſerve how *Virgil* made Choice of one of theſe Trees for the Court of his *Evander*, one of the worthieſt Princes in the beſt of Poems, ſitting in his Maple

ple Throne; we may from thence aſſure our ſelves, that in thoſe Days they were of great Statures.

AND when he brings *Æneas* into the royal Cottage, he makes him this memorable Complement: Greater, ſays the great *Cowley*, than ever was yet ſpoken at the *Eſcurial*, the *Louvre*, or *Whitehall*.

——— *Hæc* (*inquit*) *limina Victor*
Alcides——

This humble Roof, this ruſtick Court, ſaid he,
Receiv'd Alcides *crown'd with Victory:*
Scorn not (*great Gueſt*) *the Steps where he has trod,*
But Wealth contemn, and imitate a God.

N. B. THE Time for cutting, or felling this Tree, is *December* or *January*.

CHAP. XV.

Of the Sycamore, *its Manner of raiſing for Timber, in Parks, Woods,* &c.

THE Sycamore, or the *Acer majus*, is encreaſed by the Layer or Keys, ſown and order'd, as the *Acer minus*, or Maple.

Maple. 'Tis a Tree of a very quick Growth, when the Soil is natural to it, which is a light and dry (rather than a wet and cold) Loam.

The Timber of this Tree is very ſerviceable to the Turner, Wheel-wright, Sadlers, *&c.* and 'tis very beautiful, when mix'd with other Foreſt Trees, in the Quarters of a Wilderneſs.

Besides this common Kind, there is another, whoſe Leaves are variegated, that are very beautiful in a Wilderneſs, as aforeſaid: But both theſe Kinds are very much attended by *Flies* in Summer Evenings, which has often occaſioned their Removal from the Hedge-lines of Walks, into the middle of large Quarters, where they have a fine Effect, and at a ſufficient Diſtance from being offenſive.

Mr. *Evelyn* conſents to their Baniſhment from all curious Gardens, becauſe that their Leaves, in very hot and dry Seaſons, fall very early, and turn to *Mucilage*, and putrify, with the firſt Rain that falls, ſo as they contaminate and ſpoil our Walks: And indeed, ſo will the Leaves of a great many other curious Forreſt Trees, if they are ſuffered to remain on the Ground when fallen:

But

But in our curious Gardens, we always take Care to cleanſe away all kinds of Leaves as they fall, ſo that they are never offenſive. But when they are planted in the middle of large Quarters, as before directed; their Leaves cannot be offenſive, tho' never taken away.

In moſt Eſtates, there are dry hilly Lands, wherein few other Kinds of Foreſt Trees will live; and this kind will thrive very well, and become good Timber in a few Years Time, whereby thoſe Lands may be greatly improved. The Diſtances, Time, and Manner of planting is the ſame as of the Maple.

Chap. XVI.

Of the Hornbeam-Tree, *its Manner of raiſing for Timber in Coppices, Woods, Parks*, &c.

The Hornbeam is raiſed from Seed ſown in *Auguſt* or *September*, which is the Time of its Maturity; but it will not come up, until the ſecond Spring after ſowing.

It

It is the Practice of many, to keep the Seed the firſt Year in Sand, and to ſow it the ſecond *February.* after gathering. But I do not approve thereof ſo well, as to ſow it immediately after gathering, when 'tis always imbibing thoſe Juices that are at its Spring, to be the Support and Nouriſhment thereof: But this Reaſon has already been declared more at large in the preceding Chapters.

But for thoſe that are deſirous to get what Time they poſſibly can, they may be furniſh'd with young Sets of Nature's own Produce from the Woods; by which Means, three or four Years may be gain'd.

This Tree, like the preceding, delights to grow in barren Lands; but with this Difference, that they are rather cold and expoſed, than hot and dry.

The Manner of Pruning and Planting this Tree when young, and its ordering in a Nurſery, is the ſame as of the Elm, Lime, *&c.*

Amongst all the Foreſt Trees that are received in the Garden, there's none makes a more beautiful Hedge than the Hornbeam; provided that 'tis not planted too thick, and that it be young and healthy at planting.

The

The beſt Plants for theſe Purpoſes, are thoſe of two or three Years Growth in the Wood, or Seed-bed, being pruned in their Heads, to about ſix Inches in Length, and the like of their tap Roots.

The Diſtance from each other in the Hedge-lines ſhould be never leſs than nine Inches, nor more than one Foot, and each Hedge to conſiſt but of one ſingle Row only.

It has been, and is ſtill the Practice of many, to plant Hedges with double, and oftentimes treble Lines, in order to make them thick; but they do never proſper ſo well as the ſingle lined Hedges, and therefore not to be practiſed. The Perſpiration of Vegetables being conſidered, we may from thence very eaſily account for the Reaſons, why ſingle-lin'd Hedges thrive better, and make a Hedge ſooner, than thoſe that are double, or treble planted.

It has been alſo practiſed by many, to plant very large Plants from the Woods, for Hedges, and oftentimes from Nurſeries, wherein they have ſtood very cloſe to each other; and ſo for want of a free drying Air at their Bottoms, their lower Branches have periſhed, by being ſaturated with crude Sap,

Sap, for want of Perſpiration, in Hopes of having good Hedges in a ſhort Time, which they never make; for altho' their lower Parts are fully expoſed to a free Air, when tranſplanted out; yet their Bark is of a very hard Nature, and their Growth none of the quickeſt: 'Tis ſeldom ſeen that they thicken at their Bottoms, ſo as to make a full and handſome Hedge; and therefore it is, that they are, after three or four Years Growth, cut down, within nine Inches, or a Foot from the Ground, to cauſe them to thicken from the Bottom, as they advance in Height.

Now from hence it appears, that to plant very large Sets from the Woods or Nurſeries; that is, ſuch that are five or ſix Feet high, we muſt either be contented with imperfect Hedges, or loſe three or four Years of our Life, by cutting them down as aforeſaid; but if we will have but a little Patience, and plant the young Sets of two or three Years Growth, as before directed, we may aſſure our ſelves of having very fine Hedges, in four or five Years Time, that will ever after be very cloſe and beautiful in all their Parts.

It may be ſaid by ſome, who have not the Knowledge of the imbibing Natures, and Perſpirations of Vegetables, that Hedges of this Nature, that are thin at their Bottoms, may be thicken'd, by planting of lower Plants between them; but 'tis a Miſtake, that will not do; for when hot and dry Seaſons happen, then thoſe ſmall Plants at the Bottom, being over-cover'd with the tall Plants, cannot perſpire freely, and receive Nouriſhment from the Dews; and again, their Roots being very ſhallow, and leſſer than thoſe of the high Plants, they have not an equal Power to attract Nouriſhment to them, and thereby ſoon periſh.

In the Gardens of the Right Honourable the Earl of *Strafford*, at *Twickenham* in *Middleſex*, are many beautiful Hedges of this Plant; ſome of which are upwards of twenty Feet high, whoſe uncommon Beauty and Stature is in great Meaſure due to the extraordinary Skill and Management of that ingenious and well experienc'd Gardener, Mr. *John Wyat*, Gardener to that Honourable and truly Noble Lord.

And in the adjacent Gardens of the Honourable Mr. Secretary *Johnſton*, there

are likewiſe ſome beautiful Hedges of this Plant, whoſe graceful Aſpect does alſo declare the extraordinary Knowledge of their late Governour Mr. *John Lee* Senior, whom I take the Liberty to recommend for one of the moſt skilful and univerſally experienced Gardeners in *England*.

THAT pleaſant and moſt delightful Seat of *Twickenham* Park, hath its beautiful Gardens embelliſh'd with Hedges of Hornbeam, which I planted but few Years ago, from the Seed-Beds, as before advis'd, which by the indefatigable Care of the ingenious Mr. *Henry Timberlin*, Gardener to the Honourable Mrs. *Vernon* of that Place, are now become very great Ornaments to thoſe Gardens.

AND, beſides theſe aforeſaid Gardens, there are many others that are enrich'd with beautiful Hedges of this Kind, which are ſufficient Teſtimonials of their great Uſe and Beauty: And therefore I need take no further Pains to recommend the Propagation thereof for Shade in Gardens, *&c.*

In tractus longos facilis tibi Carpinus ibit,
Mille per errores, indeprehenſoſque receſſus,
Et molles tendens ſecto ſeu pariete ramos,
Præbebit viridem diverſo è margine ſcenam.
Primus honos illi quondam, poſt aditus ordo eſt,
Attonſæque comæ, & formis quæſita voluptas
Innumeris, furtoque viæ, obliquoque receſſu:
In tractus acta eſt longos, & opaca vireta.
Quinetiam egregiæ tendens umbracula frondis
Temperat ardentes ramis ingentibus æſtus.

Rapin.

In Walks the Horn-beam ſtands, or in a Maze,
Through Thouſand ſelf-entangling Labyrinths ſtrays;
So claſp the Branches copp'd on either Side,
As though an Alley did two Walks divide:
This Beauty found, Order did next adorn
The Boughs into a Thouſand Figures ſhorn;
Which pleaſing Objects Wearineſs betray'd,
Your Feet into a Wilderneſs convey'd.
Nor Better Leaf on twining Arbor ſpread,
Againſt the ſcorching Sun *to ſhield your Head.*

THE Hornbeam is a Tree of middling Growth, but oftentimes arrives to a large Stature; its Timber is of great Uſe to the Mill-wright, for Coggs to his Wheels, as well as to the Turner, Carpenter and Joiner; and for Fire-Wood there's none bet-

ter. It burns like a Candle, and (as Mr. *Evelyn* reports) was of old ſo employed;

Carpinus tædas fiſſa faceſque dabit.

To have Plantations of this Timber come to Maturity in the ſhorteſt Time, we muſt plant them out at twenty or twenty five Feet Diſtance from the Seed-beds, as before directed for the Hedges, being annually kept clean from Weeds, and defended from Cattle, as before directed for Oaks, Elms, *&c.*

Chap. XVII.

Of the Quick-beam, *or* Witchen Tree.

THE *Quick-beam*, or *Witchen-tree*, is alſo called wicky and *Spaniſh* Aſh, it being a Species of wild Aſh: 'Tis a Tree of a quick Growth, riſes to a reaſonable Stature, grows very ſtreight and ſlender, when planted very cloſe together, as all other Trees will do: But if it enjoys a free open Air, it will become very thick, and

produce good Timber in twenty five or thirty Years Time.

'Tis a Plant that will grow as well on the Mountains, as in Woods, provided that the Soil be not over ſtrong and cold, for it delights in light mellow Lands.

The Manner of propagating this Plant, is the ſame as of the Aſh, by ſowing its Berries which ripen in the Autumn, as I directed the ſowing of Aſhen Keys.

The Timber is of great Service to the Wheeler, (it having but very little Sap in it) as alſo to the Husband-man for Tools, *&c.* and 'tis very good Fuel.

The Leaves of this Tree are very like thoſe of the common Aſh, but ſomething ſmaller; and therefore I believe they are called by the Name of the *Spaniſh* Aſh.

In the Spring the Trees make a glorious Appearance, with their fine Cluſters of Bloſſoms, which produce a grateful Scent, and afterwards beautiful red Berries, that are tempting Baits for Black-birds, Thruſhes, *&c.* Who are very pleaſant Companions in a delightful Wilderneſs; and 'tis therefore that I recommend their Planting in all ſuch rural Parts of our Gardens.

CHAP. XVIII.

Of the Hazel, *its Manner of raiſing in Coppices*, &c.

THE *Hazel*, or *Wild-Nut*, is raiſed from the Nuts, which may be ſown in a light Soil as ſoon as fully ripe, or they may be kept in Sand until *February* following, and then ſown; which I rather recommend, becauſe that ſometimes they are deſtroy'd by hard Froſts.

THEY are alſo increaſed by Suckers, as *Virgil* obſerves.

Plantis & duræ Coryli naſcuntur.
Georg. 2.

Hazels from Sets and Suckers take.

THE beſt Manner of ſowing the Nuts, is in a Seed-bed well prepared and made mellow; from whence they may be tranſplanted, at two or three Years end; but if we would make our Plantations immediately with Suckers, we muſt make Choice of ſuch as are well rooted, and about the Size of a large Reed.

THE

THE ſooner your Suckers are planted after taking up, the better, at which Time their Heads muſt be prun'd, within five or ſix Inches of their Roots.

THEY delight in cold, barren, dry and ſandy Lands, and the beſt Time to plant them is in *November* or *December*: Their Diſtances are the ſame as Aſh, Oak, and other Coppice-Woods.

THE uſual Time before the firſt Felling is ten, or twelve Years, and ſometimes ſooner, according as the Nature of the Land agrees with them.

THE ſecond, and all other Fellings, are generally every ſix or ſeven Years.

THIS Wood is very ſerviceable to the Publick in many Uſes, as for Hoops, Hurdles, Poles, *&c.* and makes a very great Return to the Owner.

CHAP. XIX.

Of Fir, *and* Pine Trees, *their Manner of raiſing for Timber in Parks, Woods,* &c.

THE ſeveral Sorts of *Fir* that we have in *England* are the *Scots Fir*, the *Silver Fir*, the *Spruce Fir*, and the

Norway Fir; but the moſt likely for our Purpoſe is the *Scots Fir,* which in *Scotland* is very plenty, and of great Statures, fit for many Uſes in Buildings, as well for Pipes to convey Water for the Service of Cities, Towns, *&c.* and in *Devonſhire* there are many Firs of this Kind which are very large, raiſed from their Seed by a Gentleman now living in thoſe Parts, who has aſſured me, that they are a very great Improvement to his Eſtate, and may now be felled for the Uſe of Builders: Therefore, as their Growth is ſo very quick, as to be fit for Building-Uſe in twenty five or thirty Years Growth, and their Uſe ſo very great, I am in Hopes, that our *Engliſh* Gentlemen will ſpeedily make large Plantations thereof, ſince they thrive with great Celerity, where few or any other Kind of Trees will grow.

The Soils that they are obſerved to thrive beſt in, are moiſt and barren Gravels, ſtrong Loams, and indeed any other Soil that is not over ſandy and dry.

They are raiſed from their Seeds, which ripen in their Cones, which are taken from thence, by ſoaking them in warm Water, until they open, or by expoſing them to a gentle Fire.

The

THE Seaſon to ſow them is *March*; and beſt when in a North Eaſt Border, that they be but little expoſed to the ſcorching Heat of the Summer.

THE Mould ſhould be very mellow, and the Seeds ſown therein, at about three or four Inches apart, ſhould be cover'd about half an Inch thick with fine Mould. When they come up, be careful in preſerving them from the Birds; and when they are about two Inches high, earth them up with fine Mould, within half an Inch of their Tops. This Earthing will very much contribute to their Growth. When they have ſtood two or three Years in the Seed-bed, you may remove them into the Nurſery, (but much better to the Places where they are intended to grow for Timber) for they, no more than the Pine, delight in often tranſplanting; and therefore, if they were to be ſown in the Places where they are to remain, 'twould be much the better Way, when it can be done. For the firſt five or ſix Years, they do not thrive ſo faſt, as they will in two Years after, when they have gotten good Roots in the Earth. It will be neceſſary to disbud their lateral Buds as

they appear, and to preſerve their leading Shoots with all the Care imaginable.

THEIR Diſtances in ſingle Lines may be ten or twelve Feet, and in Woods, *&c.* about fifteen or twenty.

THE beſt Seaſon to tranſplant theſe Trees, is in *July* or *Auguſt*, as directed in my new Principles, *Page* 46. But beware of Mixtures of Dung or rich Earth.

IF your Land is very ſtiff, then you may allay the Stiffneſs, with a moderate Mixture of Sand; but at all other Times, Sand muſt be omitted.

N. B. THAT the Pine is ordered in every Reſpect as the Fir, the ſowing of the Seeds excepted, which may be covered an Inch and half, inſtead of half an Inch, as of the Fir Seed.

NOW in Conſideration, that the Propagation of theſe Trees are very eaſy and pleaſant, their Growth very quick, that they affect Soils, where no other Tree will thrive, their very great Uſe, their perpetual Verdure, and Ornament to an Eſtate, I am in hopes that our *Britiſh* Nobility, will be eaſily induced to make large Plantations thereof, with all convenient Speed,

whereby their Eſtates that are now of very little Value, will be greatly improved.

CHAP. XIX.

Of the AQUATICKS, *viz.*

The Poplar, Aſpen, Abeal, Alder, Withy Sallow, Ozier, *and* Willow.

THERE be ſeveral Kinds of Poplars growing in *England*; but the moſt common is the white Poplar; they are in general propagated from Suckers, which riſe in great abundance, as far as their Roots extend. And I have known great Quantities produced by Chips only, where the Trees have been hew'd after felling, and were never known to grow there before. The Soils that they delight in, are thoſe that are moiſt and boggy, by the Sides of Rivers, *&c.* and in moiſt fertile Loams. They may be alſo encreaſed by planting large Cuttings or Trunchions, about three or four Feet long, being buried within ſix or eight Inches of their Tops. The Diſtances of planting theſe large Cuttings, or Suckers well rooted,

rooted, may be about three or four Feet, when they are intended for Coppice Wood; but if we intend them for Timber, their Diſtances ſhould be twelve or fifteen Feet.

N. B. That altho' I have directed the burying of the large Cuttings, within ſix or eight Inches of their Tops, yet it is to be noted, that they are to be laid ſloping into the Earth, and not drive down perpendicularly, as is commonly done by the unskilful. And again, when we are to make Plantations of Suckers, we ſhould take Care to plant them as ſhallow as poſſible.

Plantations thus made, being kept clean from Weeds, and their lateral Buds diſplaced, as has been hitherto often adviſed, will in ſixteen or eighteen Years Time become good Timber, provided that their leading Shoots have been carefully preſerv'd, which muſt be always done, when we intend to have good Timber.

The black Poplar, is naturally a ſtronger and taller Tree than the white, and more ſcarce; 'tis propagated as the white; but ſeldom permitted to grow any otherwiſe than Pollards, or ſeven, eight, or nine Feet high, which are lopp'd every ſecond or third Year. The Soil is the ſame as for the white.

N. B.

N. B. That the white Poplar before deſcribed, is not the Abeal, which is a Poplar alſo, with Leaves that are much larger than the preceding white, as well as its Growth; but the Form of the Leaves are much the ſame.

The Abeal is increaſed as the preceding, and delights in the ſame Soil; but it arrives to a very large and high Stature in fewer Years.

The Tulip Tree, ſo much famed for its beautiful Flowers, that are produc'd in Form like unto a Tulip, is ſaid by Mr. *Evelyn* to be a Poplar, brought from *Virginia*, by an ingenious Lover of Planting and Gardening, Mr. *John Tradeſcant*; which may be encreaſed from its Seed, or by Layers. *Vide*, my *New Principles*, *Page* 168.

The Aſpen is alſo a white Poplar; but its Leaves are much ſmaller than the ſmalleſt of the preceding, and being more tremulous, are therefore compared to the Tongues of many of the fair Sex. This Kind of Poplar delights beſt in Soils that are ſomething deep, becauſe its Roots are more pendant than either of the foregoing.

Besides the many Services that all theſe preceding Poplars are of, for Park-pailing, Houſhold

Houſhold Uſes, to the Turner, Wheelwright, *&c.* They are very hoſpitable Trees, for any thing grows very well under their Drip, and their Shade is very kindly to Cattle in the Heat of Summer.

But their Loppings for Fuel, I cannot any wiſe recommend, the Quantity of Sulphur contained therein being very little, and their Sap abounding with great Quantities of Water; they therefore moulder away, and cannot maintain ſolid Heat, as other Woods will do, that have their Principles more ſtored with Sulphur, and leſs with Water.

The very quick Growth of the Abeal, recommends its being planted in naked and unſhelter'd Places, where immediate Shade is required, and would, (as Mr. *Evelyn* obſerves) put a Guiſe of Antiquity upon any new Incloſure, ſince its Growth is ſo very quick, that whilſt a Gentleman makes a Voyage of three or four Years, his Houſe and Lands may be ſo cover'd, as to be ſcarcely known at his Return.

The Alder is alſo a very advantageous Aquatick, and will thrive very well in Lands that are too wet for the Poplars, of which many Eſtates abound.

The

THE Manner of increaſing this Plant, is by planting large Cuttings or Trunchions thereof in the Spring, as before directed for the Poplars, at about three Feet diſtance.

BUT 'tis always the beſt Way to lay the Cuttings in Water, for the Space of two Days before they are planted, and that their Bark is not bruiſed or ſtripp'd at planting, by thruſting their Ends in the Earth, which to prevent, 'tis beſt to let them in with an Iron Crow, and afterwards with fine Earth to cloſe up the Holes very firm about them.

THIS Sort of Wood will lie a great many Years under Water, or Earth being always wet; and therefore is very uſeful in Water-works, as Sluces, Mills, *&c.* 'Tis alſo of great Uſe to the Pattin and Clog-maker, Heel-maker, and Turner. Its Coal helps to make Gun-powder, and the Bark is very uſeful to the Dyers: In brief, its Uſes are very many, and therefore well worth our Notice.

MR. *Evelyn* ſay, that of old, they built their Boats with the largeſt Parts of theſe Trees; and *Noah*'s Ark excepted, the firſt Boats we read of were made of Alder.

Tunc

Tunc alnos primum fluvii ſenſêre cavatas,
Georg. 1.
When hollow Alders firſt the Waters try'd,

Nec non & torrentem undam levis innatat alnus
Miſſa Pado.——
Georg. 2.
And down the rapid Poe *light Alders glide.*

Vitruvius recommends this Tree, to be uſed in all Sorts of Foundations that are conſtantly wet, where it becomes as hard as Stone; and ſays, that the Moraſſes about *Revanna* in *Italy* were piled with this Timber, to ſuperſtruct upon.

And Mr. *Evelyn* ſays, that at the famous Bridge at *Venice*, the *Rial* too, which paſſes over the grand Canal, they uſed great Quantities of this Wood.

The ſmall Wood is of great Service in draining of wet boggy Lands, being buried in Trenches; but where good Store of Brick-bats, Tyle-ſheds, large Pebbles, *&c.* can be had, they are much the better of the two.

The next in Order of theſe Aquaticks, are the Withy's, of which we have two Kinds, *viz.* the *Greek* or red Withy, which is

is of a very tough Nature, and therefore very uſeful in binding; and the hoary or white Withy, which is of a more brittle Nature.

The red Withy commonly arrives to a very great Stature, and its Roots extend themſelves much deeper, than either Salley or Willow; for which Reaſon, they ſhould be allow'd the Diſtances of fifteen Feet at the leaſt, and they delight more on the tops of high Banks by River Sides, than in the Water. Their Growths are much ſlower than the Salleys, which delight to grow within the reach of the Water, and in very mooriſh or flat Lands, that are unfit for either Ploughing or Meadow.

But we have three Kinds of Salleys, the one called the Hopping Salley, delighting (as aforeſaid) in ſpewy wet Lands, and grows with great Celerity. The ſecond Kind delights in Banks that are more dry (as the Withy) as alſo does the third Kind, whoſe Colour is different from both the others, having a reddiſh Bark, with Leaves of a darker green, of a leſſer Length, very brittle when young, but more tough when largely grown.

Of

Of theſe ſeveral Kinds, the firſt mentioned is the beſt, as well for quick Return, as Uſe, to the Husband-man, for Rake-Staves, Fork-Staves, and other Utenſils of like Nature, which they produce at the End of four Years Growth, (being cropped the ſecond and third).

The Manner of planting all theſe Kinds, is the ſame as of the Poplars, excepting their Lengths above Ground, which may be from one, to ſix, ſeven, or eight Feet, which great Heights are often uſed, to avoid the biting of Cattle; but the beſt Shoots are produced from thoſe Sets, that were about one Foot, or eighteen Inches above Ground, when planted: The Time of planting is *December* and *January*.

The Diſtances that theſe Salleys ſhould be planted from one another, muſt be according to the Nature of the Soil wherein they are planted. If the Soil is very fat and moiſt, we may allow them ſix or ſeven Feet Diſtance, but in Lands leſs furniſh'd with Goodneſs and Moiſture, five or ſix Feet.

And altho' this Kind of Salley delights in much Moiſture, yet 'tis obſerv'd to thrive better, when at ſome Diſtance from the

the Water, as a Foot or two, than when altogether immerſed therein.

EVERY Plant thus planted, will, at the End of three Years, produce fifteen or twenty Staves, each about eight or nine Feet in Length, that will turn to a very great Account in the Market.

THE Seaſon to cut them for Uſe is the Autumn, but for Fuel in the Spring. The Coal of Salley being of a ſoft free Nature, is therefore very uſeful to Painters, in drawing the Out-lines of their Works, inſtead of Black-lead Pencils, *&c.*

OZIERS are diſtinguiſh'd from *Salleys*, as *Salleys* are from *Withies*, being proportionably leſſer, of a ſhorter Duration, and requires a more conſtant Moiſture.

THE various Kinds of Oziers are almoſt endleſs; but the moſt known and uſeful I will deſcribe.

WE have three common Sorts, of which one is very like the Salley, but very brittle; another Kind is that which produces a very ſlender Leaf, with limber green Shoots, called the *Perch Ozier*, and the third Sort is in its Leaf exactly like the ſecond, but the Shoots are more yellowiſh and leſs

green, and of a very tough and hardy Nature.

THE Basket-Makers diſtinguiſh the ſeveral Kinds of Oziers, by the Names of *Hard Gelſter, Horſe Gelſter, Whyning,* or *Shrivell'd Gelſter, Black Gelſter;* the *hard* and *ſoft Golſton,* the *ſharp* and *ſlender Top'd yellow Golſton,* the *fine Golſton:* To which may be added the *yellow Ozier,* the *green Ozier,* the *Snake* or *ſpeckled Ozier,* the *Swallow-Tayl,* the *Spaniard,* the *Flanders Willow,* the *white Willow,* and the *Golden Yellow.*

THE Seaſon for planting either of theſe Kinds, is *December* or *January.* They are encreaſed by Sets commonly planted at two or three Feet apart, but much better in my humble Opinion, at four or five Feet.

BEFORE we make Plantations hereof, we ſhould prepare the Ground (by early trenching) very mellow, and therein plant our Sets of about five or ſix Feet high; and when they have grown three Years, then in *February* cut them off, at two Feet and a Half above Ground, and their Heads will break out into great Numbers of Shoots, that by the next Autumn will be fit for uſe.

It is the Cuſtom of many, for to turn Sheep into theſe Plantations, when the young Shoots produced after cutting down, are about ſix Inches in Length; which being cropp'd by them almoſt cloſe to the Heads from whence they ſpring, the new lateral Buds of the Parts left, do then each produce a ſingle Shoot, which are by the Autumn, fit for Uſe.

The Improvements that are made by Plantations of Ozier, may be very great, and eſpecially where the Nature of Lands are ſuch, as to produce nothing elſe.

Mr. *Evelyn* reports, That he has heard of twenty Pounds being paid for one Acre of Oziers in his Time, which is above fifty Years ſince; but at this very Juncture, where the Carriage is reaſonable, they are worth ten Pounds *per* Acre, to be bought by the Basket-maker, and be allowed a very great Pennyworth.

It has been ſaid by a late Theorical Author now well known, that if Plantations hereof were made in greater Abundance, that the Markets would be overſtock'd, and conſequently their Value leſſen'd. But if we conſider the great Conſumption that is annually made, by Packers, Fruiters, Garden-

ers, Fiſhermen, *&c.* and the great Quantities that have been, and are annually brought from Abroad, we ſhall find, that we may very ſurely go to Work, and reap great Benefit thereby, to the very great Improvement of ſuch moiſt Lands.

WILLOWS are the laſt that I have to treat of, that are of the Aquatick Tribe, of which there are divers Kinds; but thoſe that I ſhall recommend, are the White and the Black.

THE White is alſo of two Sorts, the one having its Bark of yellowiſh, and the other of a brown Colour.

THESE Sorts of Willows are propagated, by planting very large Branches, that are ſtreight and young, about ſix or ſeven Feet in Length, being ſoaked in Water, before planting, for the Space of two or three Days.

THE Seaſon for this Work is *February*, and the Manner of doing it the ſame as of the Withy, *&c.* at the Diſtances of ſix, eight, ten, twelve, fifteen, or twenty Feet; in the Operation of which, be careful that, by cutting or otherwiſe you don't peel or bruiſe the Bark at the lower Ends of your Sets that with a very ſharp Bill

you

you cut off their Ends a little ſloping, at the Time of planting, and to fix the Earth very tight about them, and defend them from Cattle, who greatly delight in eating their Leaves either green or dry.

When three Years are paſs'd (they having been kept disbudded of their lateral Buds, and ſucker'd) you may diſcretionally prune their Heads, by cutting away the moſt unpromiſing Branches, and leave the moſt hopeful for Uſe; which, when large enough, may be cut away, and the other ſmall ones left to ſucceed: And ſo on in like Manner, you may every four or five Years, continue for twenty or thirty Years, with good Profit, it being a very uſeful Wood, for many Neceſſaries in Life.

N. B. That moſt of the Aquaticks may be cut every third or fourth Year, either in the Autumn before the Winter comes on, or in the Spring, when the Winter Colds are over.

CHAP. XXI.

Of the ſeveral Soils wherein the preceding Trees delight, of which Eſtates conſiſt.

IF we conſider how wonderfully the *Omnipotent God* has adapted each Plant to its proper Soil, we ſhall find, that there's no Sort of Lands, but may be cultivated with great Advantages to their Proprietors: For Inſtance,

THE Oak will thrive in warm and deep Loams, in moiſt, clayey, Stony, flinty Lands, but not in a hungry Gravel; but the Abeal and Haſel will proſper very well therein. And again, if our Lands are mountainous, chalky, ſtony and barren, the moſt proper Trees are Hazle and Beech; if barren and much expoſed, the Hornbeam: But if a good Loam, tho' hilly and dry, the Maple and Sycamore, and for light mountainous Lands, the Quick-beam.

THE Birch will thrive very well in any dry, or wet, ſandy or ſtony Lands, Marſhes or Bogs.

THE

THE Poplars, Aſpen, Abeal, and Alder, in moiſt and boggy Lands, and the Salley in ſuch, that are by Over-moiſture unfit for the Plow or Paſture, and *Scots* Firs in moiſt and barren Gravel, ſo it be not over-ſandy.

THE Withy delights on the Banks of Rivers, and to be rather out of the Water, than in it: As alſo does the Willow, as by the Brinks of Ditches, *&c.* and the Ozier in Lands that are conſtantly moiſt, but not over and above wet and ſpewing. Thus may we ſee how all the moſt indifferent Kinds of Lands, may with Care and Diligence be greatly improv'd to a very high Degree.

THE ſeveral Kinds of Loams, which differ only in their more or leſs Quantities of Sand and Clay, which are the Principles, or Compound thereof, are the beſt of Soils, wherein all the preceding Trees will alſo proſper very well; as likewiſe the Elm, Aſh, Cheſnut, Wallnut and Service; which laſt delights in a cold, rather than a hot Loam.

Now, ſeeing that the different Natures of Soils cauſe very great Differences in the Growth of Vegetables; I believe it will

not be amiſs, if in the next Chapter I ſhould give an Account of the extraordinary Growth and Magnitudes of Trees, that have been produc'd in *England*, as well as of ſome very remarkable ones Abroad.

CHAP. XXII.

Of the extraordinary Growth and Magnitudes of Trees.

MR. *Evelyn*, in his Diſcourſe on Foreſt Trees, *Chap.* 30, *Page* 148, gives us a very ſurprizing Account of the Growth and Age of Trees, which muſt undoubtedly have had a free Perſpiration throughout their whole Growth, or otherwiſe could never have arriv'd to their prodigious Magnitudes.

THE firſt that he takes Notice of is an old decay'd Horſe-cheſnut, whoſe very Stump did yield thirty ſizeable Loads of Loggs; and in *Gloceſterſhire* was another, within whoſe Bowels was contain'd a handſome wainſcoted Room, with Windows

to

to illuminate it, furniſh'd with Seats, &c. to anſwer the *Lician* Plantanus; which I ſhall ſpeak of hereafter.

THE third (that he mentions) is a very large Lime, or Linden Tree, then growing at *Depeham* in *Norfolk*, ten Miles from *Norwich*, whoſe Circumference at ſix Feet above Ground, was twenty five Feet and a Half, at eighteen Inches above Ground near thirty ſix Feet; about the Root nigh the Earth, forty eight Feet, and the Height to the uppermoſt Boughs about ninety Feet.

The Diameter
- At Six Feet above Ground, was ſomething more than eight Feet $\frac{1}{10}$.
- At eighteen Inches above Ground, about nine Feet and a Half.
- Cloſe at the Ground, twenty eight Feet nine Inches.

THE Magnitude and Height of this noble Tree muſt, without Doubt, have a majeſtick Aſpect; as alſo that Poplar Tree, which he ſays was not much inferior to it, which lately grew at *Harlingly Thetford*, at

at the Gate of Sir *William Gawdies*, blown down by a Hurricane.

THOSE memorable Oak Trees, that were flouriſhing not many Years ago, in *Dennington* Park, near *Newbury*, were as remarkable; but more particularly three, which were ſaid to be planted by the famous *Engliſh* Bard, *Jeoffry Chaucer*, of which one was called the King's, another the Queen's, and the other *Chaucer*'s Oak.

THE King's Oak was fifty Foot clear in the Body, before any Knot or Bough appear'd, and held when ſquared full five Feet Diameter at the Butt-end.

THE Queen's Oak held very ſtreight, full forty Feet, being four Feet Diameter at the Butt, and near three Feet at the Top; ſo that even the remaining Top was not much leſs than the common Size of the largeſt Oaks that are now fell'd for Uſe, and what are valued at a very high Rate.

AT *Cunsburrow*, (he farther tells us) grew ſeveral Trees, of whoſe Butt-ends, the Proprietor made ten Pounds *per* Yard, for three or four Yards: But thoſe that produced each a Main-Maſt for a Man of War, ninety nine Feet high, and bare thirty five Inches Diameter; and the other four

ſquare

ſquare Beams, each four and forty Feet in Length, of a ſufficient Bigneſs as to lie acroſs her, did much exceed them; which Trees grew at *Farmingham* in *Suffolk*, a Country that has produced ſome of the largeſt Trees perhaps in the World.

THERE is now, (ſays Mr. *Evelyn*) at *Wotton* in *Surrey*, a large Table, that was, before being ſhortened, full ten Feet and half in Length, above five Feet broad, and ſix Inches thick, all entire and clear, which muſt be produced by a noble and uncommon ſized Tree.

Merſennus tells us, that the great Ship called the Crown, which *Lewis* XIII. cauſed to be built, had its Keel Timber, one hundred and twenty Feet long, the Mainmaſt twelve Feet diameter at the bottom, and its Altitude eighty five Feet.

HE alſo makes mention of a ſuperannuated Yew Tree that was growing about fifty Years ago, in *Braburne* Church-yard, not far from *Scot*'s Hall in *Kent*, which was near twenty Feet Diameter, whoſe Arms produced great Quantities of large Plank and Timber. And at *Sutton* Church-yard, near *Wincheſter*, he was inform'd, there

there was then growing another of the ſame Size.

Now had not Mr. *Evelyn* been known to be a moſt curious, learned, and judicious Gentleman, we might have much queſtion'd the Truth of theſe Accounts: For to conſider what a Bulk a Tree muſt make, whoſe Diameter is twenty Feet, would almoſt ſeem incredible.

The prodigious Growth of Vegetables, is again confirm'd by another Gentleman, who ſent the following Account to Mr. *Evelyn*.

'In *Sheffield* Lordſhip, there grew an 'Oak in the Hall Park near unto *Rivelin*, 'whoſe Body was eighteen Yards in Height, 'clear from Knot or Branch, and full three 'Feet and half ſquare at the upper End, 'and but little bigger at the Butt. This 'Tree was fell'd about ſixty Years ago, and 'was then ſold for eleven Pounds.' What would it be worth now at *London* was it there, at the Rate of fifty Shillings *per* Load, which is now the cuſtomary Price of ſmall Timber? We will firſt meaſure the Quantity, and ſuppoſe the Square of the Butt-end to be no larger than the Square of

of the Top-end, which was ſaid before, to be three Feet and half.

Feet.	Inches.	
3	6	
3	6	
9	0	
1	6	
1	6	
0	3	
12	3	The ſuperficial Content of the Butt.
Which multiply by 54		The Length.
48		
60		
13	6	
The ſolid Content. 661	6	which divide by 50, the ſolid Feet contain'd in a Load of Timber, (leaving out the half Foot).

50) 661 (13 Loads.
50

161
150

(11 Feet.

THIRTEEN Loads of Timber, at two Pound ten Shillings *per* Load, is thirty two Pounds

Pounds ten Shillings: to which add for the eleven Foot, eleven Shillings, and the Sum will be thirty three Pounds, one Shilling, which is two thirds more than 'twas ſold for.

But Timber of that Size is now worth double the Money, when required for the Shafts of Water-wheels, *&c.*

In the upper end of *Rivelin*, grew an Oak, known by the Name of the Lord's Oak, whoſe Circumference was thirty ſix Feet, and Top produced one and twenty Chord, or Stack of Wood.

N. B. A Chord or Stack of Wood, is three Feet high, as many wide, and twelve Feet long.

In *Sheffield* Park, about 58 Years ago, there was cut down a Tree that was thirteen Feet Diameter at the Kerf, where 'twas cut off near the Root.

In the ſame Park (ſaith my Author, Mr. *Evelyn*, who wrote about ſixty Years ago) near the *Old Ford*, is an Oak Tree yet ſtanding, of ten Yards Circumference, which is ten Feet Diameter.

In *Workſopp* Park, at the white Gate, grew an Oak, whoſe oppoſite Boughs meaſured from their Extreams, one hundred and eighty Feet.

If

If we conſider 180 Feet, as the Diameter of a Circle, we may eaſily find the ſuperficial Content, as following.

Multiply 180
by 180

14400
180

Product 32400
Multiply by 11

32400
32400

Divide by 14) 356400 (25457 ¼ ſquare F.
28

76
70

64
56

80
70

100

98

2 Remains, = 2/7

Divide

Divide 25457 by 9, the ſquare Feet in a Yard.

9) 25457 (2828 ſquare Yards.
18

74
72

25
18

77
72

5 Remains.

THIS 2828 $\frac{5}{9}$ Yards, is the Quantity of Ground that this Tree covers, or perpendicularly drops upon; which being reduc'd into ſquare Poles, is equal to half an Acre, and fourteen Rods, as following.

	Yards.	
One Rod in Length, is	5	$\frac{1}{2}$
Which multiply by	5	$\frac{1}{2}$
	25	
	2	$\frac{1}{2}$
	2	$\frac{1}{2}$
		$\frac{1}{4}$
The ſquare Yards in one Rod	30	$\frac{1}{4}$

Now divide 2828 by 30, leaving out the ¼:

30) 2828 (94 Rods, equal to half an Acre, and 14 Rods.
270

128
120

8 Remains.

Suppose that a Horſe, when ſtanding, takes up the Space of three ſquare Yards, then there may ſtand nine hundred and forty two Horſes under the Drip of that Tree. For 2828 being divided by 3, the Quotient is 942. See the Diviſion:

3) 2828 (942 ⅓
27

12
12

08
6

2 Remains.

In *Welbeek-Lane*, there ſtood an Oak called Grindal Oak, whoſe Circumference

at { 1 Foot, 2 Feet, 6 Feet } above the Surface of the Earth: { 33 Feet, 28 Feet, 25 Feet. }

The Height to the top-moſt Bough, 81 Feet. *Vide Evelyn's Sylva*, Page 157.

THESE Accounts of the very great Growth of Trees are ſomewhat more modern, than thoſe that *Pliny* tells us were growing in his Time in the *Hercynian* Foreſt, whoſe Roots had raiſed even Mountains; and where they encounter'd in their Growth, raiſed up, and form'd large Arches, like unto thoſe of the grand Enterances into magnificent Cities.

WE may from the preceding Lectures find, that as Vegetables abound more or leſs with Quantities of Oil, ſo do they ſooner or later arrive to their Maturity, and after that, their Decay.

THE ingenious Mr. *Evelyn* obſerves, that the Age of Timber Trees, eſpecially thoſe whoſe Natures are compact, reſinous or balſamical, (that is very Oily) are thereby capable of very great Durations: Of which the Yew, Box, Juniper, Cedar, and other Evergreen Trees more abound, than the Oak, Elm, Beech, or Aſh; and thoſe more than Willows, Abeals, *&c.*

HE further adds, that the Duration of Trees may in ſome Meaſure be adjudg'd by their natural Growth, and Nature of their

Roots. Thus ſaith he, thoſe Trees that produce the largeſt Roots, are Trees of the longeſt Duration, as alſo thoſe that are what he calls *Gummy*; that is, abounding very much with oily Particles; for thoſe that abound greatly with Moiſture, are of a much quicker Growth, and conſequently of a ſhorter Duration; for, as the old Proverb ſays, *Soon ripe, ſoon rotten*: And therefore 'tis very reaſonable to believe, that Trees which produce Fruit, cannot be of ſo long a Duration, as thoſe that are barren; becauſe where much Fruit is produc'd, much Nouriſhment is required, which muſt unqueſtionably reduce the Strength, and conſequently the Duration of the Tree alſo.

The old Platanus planted by *Agamemnon*, mention'd by *Theophraſtus*, and the *Herculean* Oaks; the Laurel near *Hypocren*, the Vatican *Ilex*, and the Vine, which was grown to ſuch a Magnitude, as to make Columns in *Juno*'s Temple, have been ſufficient Evidences of the great Growths and Duration of Trees. And *Pliny* makes mention of a Vine that was ſix hundred Years old, which undoubtedly grew in a warm natural Soil; for as I have before obſerved, and proved, Vines delight more in Heat than in

Moiſture, which contributes very much to their immediate decay.

At *Eguan*, the old Duke of *Montmoramy*'s Houſe, is a Table (ſaith Mr. *Evelyn*) of a very large Dimenſion, made of the ſame Plant.

The old *Lotus* Trees, recorded by *Valerius Maximus*; and the *Quercus mariana*, celebrated by that Prince of Orators. The great *Latrix* of *Pliny*, and thoſe that grew in the fortunate Iſlands, were alſo famous for their very great Duration.

And 'tis affirm'd by St. *Hierome*, that he ſaw the Sycamore Tree that *Zaccheus* climbed up, to behold our bleſſed Saviour ride in Triumph to *Jeruſalem*: And at this Time in the *Aventine* Mount, they ſhew us the *Malus Medica*, planted by St. *Dominic*.

'Tis reported, that in *Congo*, there are Trees capable to be excavated in Veſſels, that would contain two hundred Men a-piece.

To which may be very juſtly added, thoſe very old *Tiliæ*, now at *Baſil* and *Auſpurg*, under whoſe delightful Shade, they ſo often feaſt and celebrate their Weddings; not with regard to their Shade only, but

their

their reverend Antiquity; for to Trees of ſuch Age, they paid divine Honours, as the neareſt Emblem of Eternity, & *tanquam ſacros ex vetuſtate*, as *Quintilian* ſpeaks.

To mention every Plant in the World, would run out this Volumn beyond its intended Magnitude, as well as deviate from the Deſign of the Work; and therefore I ſhall only ſome few others, with which Mr. *Evelyn* concludes, referring the more curious Reader to thoſe undoubted Records mentioned by our Naturaliſt, in his 44 *Chap. Lib.* 16. where he'll be entertain'd with an Account of the Olive Trees of *Scipio Africanus*, *Dianus Lotus*, the ruminal Fig-tree, whoſe Duration, according to the Calculation of *Tacitus*, was 840 Years. The *Ilex*, or evergreen Oak, of very great Antiquity, imported by the *Hetruſcian* Inſcription, thereon reported,

Pauſanias in his *Arcadies*, is of the Opinion that the *Samian Vitex*, is one of the longeſt Date; and the *Platanus* planted by *Menelaus*.

The *Delian* Palm, he further adds, to be coævous with *Apollo*; and the Olive that *Minerva* planted alſo.

THESE very large Trees were in very great Eſteem of the Antients; inſomuch that, that hot prudent Conſul, *Paſſienus Criſpus*, fell in Love with a beautiful Beech, of a very great Magnitude and Age. And that judicious Prince *Francis* the Firſt, did the ſame with a huge ſturdy Oak, which by his Order was curiouſly immur'd at *Bituriges*.

THAT moſt beautiful Tree the *Roman Platanus*, of which I planted many in the Gardens of the late *Thomas Vernon*, Eſq; at his Seat of *Twickenham Park, Middleſex*, was antiently in the greateſt Eſteem, tho' now not ſo much, in regard to its being late in the Spring before it comes into Leaf, and drops its Leaves very early in the Autumn; which laſt is cauſed by being planted in a dry, inſtead of a moiſt Soil, wherein it moſt delights.

Ælian, and ſeveral other Authors aſſure us, that *Xerxes*, coming to a fine, large, and ſtately Tree of *Platanus*, ſtopt his Army of ſeventeen hundred thouſand Soldiers for many Days, to admire the Statelineſs, and ſolemn Beauty thereof; and became ſo much in love therewith, that he adorn'd it, with not not only his own Jewels, Gold, *&c.* but the Necklaces, Scarfs, Bracelets, and infinite o-

ther

ther Riches of his Concubines, and others of his great People about him.

THIS beautiful Production of Nature had ſo great an Effect on him, that for many Days he laid aſide all Thoughts of his grand Expedition, Intereſt, Honour, *&c.* notwithſtanding the neceſſary Motion of his Portentous Army did endeavour to perſuade him from it. His very great Love to this lovely Vegetable, cauſed him to ſtyle it his Miſtreſs, his Minion, and his Goddeſs: And at his Departure from it, cauſed *the true Figure thereof* to be ſtampt on a *Medal of Gold*, which he always wore about him, in *Memory* of that good and ſtately Tree.

THUS may we behold how vaſtly ſhort we are, in knowing the true Value of the moſt valuable Plants.

'TIS alſo recorded, that the *Lician Platanus* had a Room in it of eighty one Feet Circumference, richly furniſh'd with ſtately Seats, and Tables of curious Stone, adorned with pleaſant Fountains.

THE vaſt great Beauty and Magnificence of this Tree, did often invite *Licinius Mutianus* (thrice Conſul, and Governor of that Province) to feaſt his whole Retinue

within it; delighting more therein, than in his magnificent Palace, whoſe Roof was cover'd with Gold.

AND of later Date, we have an Account of that vaſt *Cerrus*, wherein an Hermit built his Cell and Chapel, ſo much celebrated by the noble *Fracaſtorius*, in his Poem *Malteide*, *Cant.* 8. *Stro.* 30.

BUT the moſt ſurpriſing, are what Mr. *Evelyn* further adds, *Page* 151. of which Sir *Francis Drake* meaſured the Girt of a Maſtick Tree, to be one hundred and two Feet. *Now, ſince that the Ratio of the Circumference of Circles to their Diameters*, is as 355 to 113; or in leſſer Numbers, as 22 is to 7; therefore the Diameter thereof was 32 $1\frac{1}{2}$ Feet. See the Work.

Circ. Feet. Circ. Feet.
As 22 is to 7, ſo is 102, to 32 $1\frac{1}{2}$ Feet.

7

22) 714 (32 $1\frac{10}{22}$.
66

54
44

10 Remains, equal to $\frac{10}{22}$, equal to $\frac{1}{2}$.

AND

And thoſe of *Nicaragna* and *Gambra* were vaſtly great, when ſeventeen Perſons of a common Stature could hardly fathom about the Bodies.

Pliny reports, That *in India, Arbores tantæ proceritatis, traduntur, ut ſagittis ſuperari nequeant. Hæc facit ubertas ſoli, temperies cœli, & aquarum abundantia.*

Those Trees recorded by *Theophraſtus* and others, growing in *Corſica*, and near *Memphis*, were of the like Kind: But the moſt ſurprizing Trees for Height, are thoſe unparallel'd Palms Royal, of two and three Hundred Feet perpendicular Altitude, deſcrib'd by Captain *Ligon*, growing in *Barbadoes*. The Relations of *Bembus* and *Cardan* are alſo as ſurpriſing the firſt ſpeaking of thoſe twenty Fathom'd antartick Trees, and the latter of thoſe called *Ciba*, whoſe Nature is to riſe at about twenty Feet Diſtance, in Stems of the like Circumference, and to unite together at fifteen Feet above Ground, conſtituting grand Arches, ſomething like unto thoſe of the *Gothicks*, from whence they all aſcend in one entire Body or Shaft of 37 Feet Diameter, to a prodigious Altitude.

In the Iſland of *Cyprus*, (*Matthiolus* reports) grew a Tree that contain'd one Hundred and thirty Feet Altitude of ſound Timber: And upon Mount *Ætna* in *Sicily* is a Place called the *Ire Caſtayne*, from three Cheſnut Trees there growing, in one of which that was remaining about ſixty Years ago, a conſiderable Flock of Sheep were uſually folded. And *Kercher* having ſeen them, ſaith, *Et quod forſan παραδοξον videri poſſit, oſtendit mihi viæ dux, unius Caſtaneæ Corticem tantæ amplitudinis, ut inter eam integer pecorum grex à paſtoribus, tanquam in Caula, commodiſſimæ noctu includeretur.* China Illuſt. P. 185.

Now to conclude this ſtrange Account of the Growth of Trees, with ſome Things ſtill more ſurprizing, Mr. *Evelyn* further reports, That in the Province of *Chekiang*, there grew a Tree that was ſo ſtupendouſly large, that eighty Perſons of a common Stature could hardly embrace or fathom about it; and if we account the Fathom of each Perſon to be but four Feet, one with the other, (which is much too little) the Circumference of the Tree will be three Hundred and twenty Feet.

80 People
4 Feet each Fathom,

Feet 320 The Girth or Circumference.

Feet. Feet. Feet. Feet.

Now, as 22 is to 7, ſo is 320 to 101 $\frac{9}{11}$ the Diam.

7

22) 2240 (101 $\frac{9}{11}$ Feet Diam.
22

0040
22

18 { remains equal to $\frac{18}{22}$ or $\frac{9}{11}$.

Now, to avoid Trouble, we'll omit the Fraction $\frac{9}{11}$ (altho' we might very juſtly make it an Integer, and reckon the Diameter 102) and account what Quantity of Timber is contain'd in one Foot high at that Girth, allowing the Diameter to be but 101 Feet.

101
101
101
101

The Diameter ſquared. } 10201

Multiply by 11

10201

10201

10201

Divide by 14 | 112211 (8015. $\frac{1}{14}$ ſolid Feet
112

021
14

71
70

1 Remains $\frac{1}{14}$.

Now, divide 8015 by 50, the Number of ſolid Feet in one Load of Timber, and the Quotient will be 160 $\frac{15}{50}$ the Number of Loads contain'd in one Foot in Height.

50) 8015 (160 Loads 15 Feet.
50

301
300

15 Remains $= \frac{15}{50} = \frac{3}{10}$

Which is a ſurpriſing Quantity; but much more the whole Tree. There was within

a Hundred Years ago, ſome ſtrange and almoſt incredible Oaks, growing in *Weſtphalia*, whereof one was one Hundred and thirty Feet high, and (as reported by ſome) thirty Feet Diameter; and another ſo vaſtly large, as to ſerve both for a Caſtle and Fort.

Scamozzi, one of our Celebrated Architects, reports, That he ſaw a Table made of Walnut Tree, at St. *Nicholas*'s in *Lorraine*, that held full twenty five Feet in Breadth, all of one entire Piece, with a Length and Thickneſs proportionable, and beautifully adorn'd with its natural Colours, which undoubtedly render'd it the moſt beautiful Table of the World.

CHAP. XXIII.

Of the Government of Timber Trees, and Coppice Wood, after planting and felling.

1. THE firſt Care required after planting, is to preſerve our Plantations from the Injuries of Winds and Cattle; the firſt

firſt by ſtaking, and the laſt by fencing, as directed before.

2. To keep them clean from Weeds in the Spring and Summer, and digg'd early in the Autumn, to let in the Winter's Rains, and mellow the Surface.

3. That the Side or collateral Buds of Timber Trees be diſplaced, when they firſt appear, for by this Means the whole Nouriſhment will be imploy'd in the Growth of the Boal; and conſequently will make Timber much ſooner, than when the greateſt Part is ſpent in unprofitable Branches.

4. That the neareſt Diſtance of Coppice Wood be never greater than five Feet at firſt planting; becauſe every Felling will render them wider, at the Will of the Woodward, as the Timber Trees grow up.

5. That young planted Trees, in Orchards, Meadows, or plow'd Lands, be always kept clear of Graſs, Corn, *&c.* a full Yard at leaſt about their Stems; for when 'tis permitted to grow nearer, the Trees are depriv'd of their proper Nouriſhment, and cannot thrive as deſir'd.

6. It often happens, that from one Root, many Branches ariſe confuſedly, of which you muſt make Choice of the very beſt, and

and diſplace all the others. By this Means you will have a Timber Tree in a ſhort Time, whereas had they all been continued, they would be only fit for Fuel, *&c.*

7. By the preceding Directions of diſbudding the Side Budds, when they appear, our Timber will naturally be ſtreight, and free from Knots, and conſequently of much greater Value than Timber that is full thereof.

But ſince that crooked Timber is of great Value to the Ship-wright, Wheel-wright, and Mill-wright, we may for their Uſes bend to ſuch Curves, as are beſt fit for their ſeveral Purpoſes, as many young Oaks, Elms, Beeches, *&c.* as we pleaſe, fixing their Heads bow'd down, by twiſting them in their next adjoining Trees. But they ſhould in general be bowed towards the South, becauſe their Sap will then have its natural Attraction by the Sun's Heat, and they will remain in their curv'd Poſitions; whereas, when they are bent to the northward, they will, by the Attraction of the Sun, break looſe, and become perpendicular again.

8. When Timber Trees grow crooked, by the Contraction of their Sap Veſſels, more

more on one Side than the other; the only Help, is to cut or ſcore the Bark horizontally, nearly through on the inward Side, in ſeveral Places: And Trees that are Bark-bound, may be relieved, by ſcoring the Bark from their Tops to their Bottoms, perpendicularly.

9. Copses are oftentimes fell'd at ſeven or eight Years after planting, but one felling at ſixteen Years, turns to a much greater Account than two of eight Years each; for the ſeldomer that Coppices are fell'd, the greater Profits ariſe.

By the Statute of 35, *Henry* VIII. all Copſes fell'd under 24 Years Growth, were to leave twelve Standils of Oak upon every Acre, or the like Number of Elm, Aſh, Aſp, or Beech, if not Oaks, ſufficient; but as 'tis to our Intereſt to leave more, as I have already prov'd, we ſhould, inſtead of leaving twelve on an Acre, leave thirty; and inſtead of leaving them, until they are ten Inches ſquare, within a Yard of the Ground; leave them, until they are at leaſt double that Magnitude. If theſe Directions are duly executed, we ſhall reap a quadruple Return more, than when they are cut down ſo very often, and under Size.

10. 'Tis

10. 'Tis ſuppoſed, that there's no Occaſi- of directing the Place where to begin fel- ling, ſince by beginning at one Side, the Carts and Horſes can enter, without doing any Prejudice to thoſe Trees that are left ſtanding.

11. The Seaſon for felling of Under- woods, is from the midſt of *September*, to the Midſt of *November*, and no longer; for when Wounds are made in very wet and cold Weather, the Trees imbibe the Wet and Cold, that oftentimes does them very great Injuries.

And about the Middle of *January*, when the Froſts are over, you may begin felling again, and continue, until the Mid- dle of *March*.

12. In the felling of Underwoods, we ſhould always obſerve to cut them within ſix Inches of the Ground, with the ſlope Part of their Cuts, next the ſouth Sun, thereby to be heal'd as ſoon as poſſible.

13. The Time for felling Oaks, is the Middle or End of *April*, when the Heat of the Spring has rarified the Sap to ſuch a Degree, as for the Bark to ſtrip eaſily off, which is of great Service to the Tanner. But Elms, Aſh, Beech, *&c.* ſhould be fell'd

in the very Depth of Winter, when their Sap hath the leaſt Action.

14. THERE is great Care and Judgment required in the felling of large Oaks, to diſcharge the Boal of all large Branches, Limbs, *&c.* that may endanger the Fall, and to cut a Kerf round the Body, to prevent their Butt-ends from ſplitting in their Fall.

15. BEFORE that we begin to make our Fall, we ſhould make a Survey of our Trees, and examine which are in a thriving State, and which are declining; which laſt ſhould undoubtedly be fell'd firſt, and the moſt thriving hereafter, when more largely grown; and indeed we ſhould alſo conſider of the ſeveral Uſes that we intend them for, and make our Choice accordingly.

16. WHEN your Timber is thus fell'd, be careful that you are not deceiv'd in the Meaſure, by which you diſpoſe of it; for if Care is not taken herein, you may be cheated out of above one Half of your Timber, and think that you are juſtly dealt by alſo; an Account of which I have given, and demonſtrated in the Appendix hereof.

17. YOU muſt carefully cleanſe away, and bind all the Bruſh-wood, as Loppings, *&c.*

before

before the Roots begin to ſhoot afreſh, that the young Shoots may not be interrupted in their firſt advance: And to preſerve them from the Injuries of Cattle, until largely grown.

By the 13. *Elizabeth*, yearling Colts and Calves may be put into incloſ'd Woods, after five Years, and no other Cattle till ſix, when the Growth is under fourteen Years, or until eight, if exceeding that Age till the laſt Felling.

18. Fuel-wood may be cut from *Michaelmas* until *Candlemas*, and Stack-wood may be cleaved at any Time. When you ſet up Stacks of Billet Wood, their loweſt Courſes ſhould be ſet on End, and the others length and breadth-wiſe at Pleaſure.

By the Statute, every Billet ſhould be three Feet and four Inches in Length, and ſeventeen Inches and a Half compaſs; ten or fourteen, as they are accounted for one, two, three, *&c.*

A Stack of Wood is a Solid made of twelve Feet long, three Feet wide, and as many in Height, containing 108 cubical Feet; and in ſome Places a Stack of Wood is made of eight Feet in Length, four wide, and as many in Height, containing 128

cubical Feet, which is twenty Feet more than the preceding.

FAGGOTS ought to be made truly round and not flat, (for then they contain much leſs than they ſhould do) their Length by the Statute is a full Yard, and their Circumference two Feet. By the *7th Edward* VI. Billets of one Caſt are to be ten Inches about; of two Caſt, fourteen, *&c.* which are to be marked with Notches; thoſe of one Caſt, within four Inches of the End, and thoſe of two Caſt within ſix Inches of the Middle. But by the 43 *Elizabeth*, every ſingle Billet being round, to contain ſeven Inches ½ Girth, but no ſingle Billet to be made of cleft Wood; if marked one and round, to contain 11 Inches Girth; if half round 13, or if quarter Cleft 12 Inches ½.

IF marked two being round, to contain 16 Inches; half round 19; quarter round 18 ½, and their Length as before.

ALL the Sticks in Faggots muſt be full three Feet in Length, one excepted, which is to wedge and harden the Binding, whoſe Length is to be but one Foot.

OAKS being headed, and made Pollards, are in ſome Countries very profitable, and will laſt for many Ages; but the Elm will not;

not; for immediately after the heading of an Elm, it imbibes the Wet, and ſoon becomes rotten and hollow.

AND the ſame does generally happen, when the Arms of Trees are lopp'd, with the Face of the Cut upwards, as repreſented by the Arm C, of *Fig.* A B; which is a perfect Pipe to convey the Wet into the very Heart of the Boal, which cauſes an immediate Decay. To prevent ſuch Damages, the Cut muſt be made upwards, as the Arm D, or rather cut cloſe to the Boal, as at E.

CHAP. XXIV.

Of TITHES *incident to Woodlands, Coppices*, &c.

ALL Timber-trees, upwards of twenty Years Growth, are not to pay Tithes; but if they are cut down before that time, they are tithable; and therefore all manner of Coppice Woods are tithable, becauſe they are generally cut down twice or thrice in that Time.

BUT if we cut down Coppice Wood for the Uſe of the Premiſſes, either for Mounds, Fencing, Plow-boot, or Fuel for the Owner, no Tithes are due.

WHEN Trees are lopp'd under twenty Years Growth, and afterwards permitted to grow paſt twenty Years, and are then lopp'd again, no Tithe is due for them, though at the firſt Lopping, it were not ſo.

NO Tithe is paid for Hop-poles cut down, where the Vicar is paid Tithe for the Hops that grow upon them. But more hereof may be more largely ſeen in *Cook*'s Reports, 11, 48, 49, 81. *Plow.* 470. *Browlow*'s Reports, *Part* I. *p.* 94. *Part* II. *p.* 150. D. and *1ſt.* 169. *&c.*

AN Acre of Coppice Wood, of ſixteen Years Growth, muſt undoubtedly be worth a great deal of Money, if it has been well managed: But at one and twenty Years end, the Value is much greater; ſo that I adviſe every one that plants ten Acres of Coppice Wood, to have Patience till the 21 Years are expired, and then to deal with the Country Parſon as they pleaſe. But if you cut it before twenty Years are over, you muſt comply with that as pleaſes him beſt.

THE

THE preceding Directions being well executed by the Woodward, every Gentleman that's concern'd in theſe noble and rural Imploys, will find an abundance of Pleaſures, and great Profits alſo: Beſides, 'tis the only Means of perpetuating the Glory and Happineſs of this now powerful and proſperous Nation, to the laſt Age of the World.

I ſhall now by Way of Appendix, proceed to demonſtrate the great Loſſes that Gentlemen ſuſtain, when they ſell their Timber by the common Way of Meaſuring, and how impoſed on when they buy the cuſtomary ſquare Meaſure: A Deceit in Trade that's highly worthy of the Conſideration of our Legiſlators.

APPENDIX.

Of the Menſuration of Timber, after the common Method, and the deceitful Ways of taking Dimenſions with Geometrical Rules, for the true Menſuration thereof.

THE Cuſtoms uſed in meaſuring Timber, is to take the Lengths to Feet and half Feet, and the Girths in Inches only, which is uſually taken at the middle of the Trees Length. Thus if a Tree is forty Feet in Length, the Girth is taken at twenty Feet from Top or Butt, provided that the Tree hath a gradual Diminution from End to End (as *Fig.* A B): But if the Body of the Tree to be meaſured has a very large But-End, for fifteen, ſixteen, eighteen or nineteen Feet long, when the whole Length is forty Feet, (as aforeſaid) as *Fig.* D E, and afterwards its Thickneſs falls off very conſiderably, as G H;

H; then the Part G H muſt be meaſured ſingly by its ſelf, as A B, ſo alſo muſt the Part D G; and their Quantities added together, will be the Content of the whole.

BUT had this Piece of Timber been meaſured by one Dimenſion as the other Piece, *Fig.* A B, then its Girth would be taken at I, where 'tis very ſmall; and the extraordinary Thickneſs *a a*, quite about the ſmall Body G E, would be loſt in the Meaſure.

THIS is one Way, that many times Gentlemen are cheated out of great Quantities of Timber; but not the moſt material one.

WHEN a Piece of Timber is meaſured at two or three Dimenſions, as D E is at twice, 'tis called by Workmen, *Joggling* the Piece.

IT is a common Thing among Workmen that buy Timber, and find the Meaſurer againſt them to be an eaſy Man, or a Green-horn at the Buſineſs, of which we have many, to agree before they begin to meaſure; that let the Middle of Pieces of Timber fall how they will, great or ſmall, their Girths ſhall be taken there. This the young Meaſurer thinks to be very fair Dealing, and therefore agrees to it, not conſidering that where one Tree is largeſt, or its

its mean Thickneſs in the middle, there's ten that are leſs; ſo that when he takes their Girths at their middle Lengths in general, he never fails of loſing many Loads of Timber in a large Quantity. Therefore to be certain of the true Dimenſions, the Meaſurer muſt always obſerve the Figure of every Tree, and when they are not of an equal Diminution from Butt to Top, then he muſt joggle them, as before directed.

THERE is alſo another great Injury that People ſuffer, by the manner of taking the Dimenſions, which the Seller thinks is an Advantage to him; which is, leaving the Pieces with all their taper Tops on to a great Length, whereby the Girth is taken in a much ſmaller part of the Tree, than when twenty or twenty five Feet of the Top is cut off, and meaſured by it ſelf.

WOULD it not ſurprize any one to think, that to leave 16 Feet in length on, to a Piece that is but twenty four feet long in the whole, ſhould cauſe the whole, being meaſured together (by the common way that gives a Content about one fifth leſs than the true Way;) to be near two fifths leſs than it actually is? Or, would it not again ſurprize us as much, that eight Feet in Length,

Length, cut from the Butt, and leaving the other ſixteen Feet in Length as nothing, ſhould meaſure to four ſolid Feet and an half more, than when the Top of ſixteen Feet was meaſured with it.

THAT the Fraud hereof may appear plainly to the whole World, for the Advantage thereof, I will illuſtrate the Fact thereof.

SUPPOSE that a Piece of Timber is twenty four Feet long, as K, O, that the Girth at the Butt K is 6 Feet, one Fourth thereof is 18 Inches, that the Girth at the Top, O, is 12 Inches; one Fourth thereof is three Inches; for you muſt note, that the Method of girthing Timber, is to girth it about with a Line, and then take one fourth Part of that Girth for the Side of a Square, and then meaſure it as ſquare Timber, whoſe Sides are ſeverally equal to that one fourth of the Girth ſo taken. But this is notoriouſly falſe, as will appear in its Place.

THE Girths at each Ends, and Length, being determin'd, 'tis alſo ſuppoſed, that the Sides of the Timber are ſtreight from Butt to Top, *viz.* from K to O, which ſeldom or ever happens; for to the contrary, moſt Trees hold an equal Thickneſs, many Feet

Feet forward from the Butt, whereby they meaſure much more than when they immediately diminiſh from the Butt: But that Advantage I'll give to the Workman.

SINCE the Sides are ſuppoſed to be ſtreight, it therefore follows, that the Girth in the Middle at M, muſt be 36 Inches, *viz.* 9 Inches, one fourth Part thereof, and conſequently the Girths at every third Part of the Length, *viz.* every eight Feet at L and N, will be, that at L four Feet, one fourth thereof being one Foot, or twelve Inches, and that at N two Feet, one Fourth thereof being ſix Inches; for as the fourth Part of the Girth at O, 3 Inches, is to the one fourth Part of the Girth at N 6 Inches; ſo is the one fourth Part of the Girth at L 12 Inches, to the one fourth Part of the Girth at K 18 Inches.

THESE ſeveral Dimenſions being thus ſettled, we will now proceed to the Work in Hand, which when clear'd, as will immediately be, will greatly ſurpriſe the honeſt Gentleman, that has ſold great Quantities of Timber, and guard him for the future; and if I miſtake not, make the crafty Timber Merchant bluſh, to ſee his fraudulent Dealings expoſed.

THE

THE common Way of meaſuring Timber, is by the double Line of Numbers, placed on a ſliding Rule for Expedition Sake, and ſometimes arithmetically; but that both Ways may be made plain, I will illuſtrate this Example, firſt arithmetically, and laſtly inſtrumentally.

THE whole Length K O being 24 Feet, we muſt therefore girth it in the Middle at M, where the fourth Part of the Girth, is 9 Inches.

The ¼ of the Girth	9	Inches
multiplied into its ſelf	9	
Product	81	ſquare Inches, the ſuppoſed mean Area between the Butt and End.
The Length	24	Feet, muſt be reduced into Inches, by being multiplied by 12
	48	
	24	
The Product is	288	The Length in Inches.

Which

Which 288
multiply by 81 the mean Area,

288
2304

Product 23328 The ſuppoſed ſolid Inches in the whole Piece; which divide by 1728, the ſolid Inches in a ſolid Feet.

A.	
Diviſors.	Times.
1728	1
3456	2
5184	3
6912	4
8640	5
10368	6
12096	7
13824	8
15552	9

1728)23328(13 ſolid Feet.
1728
6048
5184
Remains 864 Inches.

B.	
1728	1 Foot.
1296	3 qrs.
864	half Foot.
432	1 qr.
216	half qr.

N. B. That before you begin to divide the Quantities of Timber, after the ſolid Content is found in Inches, 'tis beſt to make a Table of Diviſors, as the Table A, wherein you'll readily find how often your Diviſor is contain'd in your Dividend, without

without any Trouble of making Eſſays by Multiplication, &c. This Table is made by placing the Diviſor at the Head thereof, writing againſt it the Number 1, ſignifying once; then double it, or multiply it by 2, and write down the Quantity 3456 under 1728, and againſt it the Number 2, ſignifying twice; then to this add the upper one, and againſt it write the Number 3, ſignifying three Times; and in like Manner, by adding the firſt and laſt together, you may make your Table of Diviſors, as in the Margin. If a Table of Diviſors thus made be laid by, or rather written on a ſmall Piece of Paſt-Board, and hung up in the Study, or Counting-Houſe, &c. It will be ready at all Times, when we have Occaſion to meaſure Timber.

We ſhould alſo make a Table of the ſolid Inches in an Half, Quarter, and half a Quarter foot, as the Table B. This Table is eaſily made, by halfing the Inches in the ſeveral Quantities; by which you readily ſee the Quantity of the remaining Inches, after Diviſion is made. Thus much for the Tables.

By

By the preceding Diviſion it appears, that the ſolid Content of the Piece of Timber K O, is 13 Feet 864 Inches, which is equal to ½ of a ſolid Foot. ☞ This well obſerve.

Now I will ſuppoſe, that the Top is cut off at N, and that we have but a Length of ſixteen Feet, inſtead of twenty four Feet, as before. The mean Girth of the Middle of this laſt length is 12 Inches. ☞ Now obſerve this Operation.

The ½ of the middle Girth at L	}	12 Inches.
Multiply into itſelf by	}	12
		24
		12
Product		144 ſquare Inches, the ſuppoſed mean Area between the Butt and Top.

Now, reduce 16 Feet, the Length into Inches.

The

The Length 16 Feet.
Being multiplied by 12

32
16

The Product is 192 the Length in Inches;
Which multiply by } 144 the mean Area.

768
768
192

Product 27648 the ſuppoſed ſolid Inches in the whole Piece.

Now, divide this Quantity in Inches, by a Foot ſolid, and let's ſee the Quotient.

1728) 27648 (16 ſolid Feet.
1728

10368
10368
00000 Remains.

☞ Now, is not this ſurprizing, that tho' the Top N O, which is eight Feet long, and not taken any Notice of in this

Menſuration; the ſolid Content now found ſhould be ſixteen Feet, when the whole meaſur'd together, by the ſame Rule, meaſured but to thirteen Feet and a half.

HENCE it appears plainly, that by cutting off the Top N O, we gain two ſolid Feet, and an Half, and the Top alſo. ☞ But obſerve further, which will yet ſurprize you more.

WE will now ſuppoſe, that the Butt is cut off at L, and that we are to take no Sort of Notice of the Top L O. The Length of this Butt, is but 8 Feet, and its mean Girth in the Middle at P, 5 Feet, one fourth thereof being 15 Inches. ☞ Now, obſerve this Operation.

The Middle Girth	15 Inches.
Multiplied by its ſelf	15
	75
	15
The Product is	225 ſquare Inches, the ſuppoſed mean Area between Butt and Top.

The

The Length of the Piece 8 Feet,
Being multiplied by 12

Product 96 { The Length in Inches.
Which multiply by 225 the Mean Area.

96
225
480
192
192

Product 21600 The ſuppoſed ſolid Inches in the whole Piece.

Now, divide this Product by a ſolid Foot, and obſerve the Quotient.

1728) 21600 (12 ſolid Feet.
1728

4320
3456

864 Remains.

☞ Here we are again aſtoniſh'd, for tho' there is 16 Feet cut from the Length, and but 8 Feet in Length of the Butt meaſured; yet the Butt meaſures to 12 ſolid

Feet and ½, which is but one Foot leſs than the whole when meaſured together. And tho' this laſt Menſuration gives 12 ½ ſolid Feet, which is much more than any one could imagine; yet I will preſently prove, that the ſame Butt-End does actually contain a fifth Part more, *viz.* 15 ½ ſolid Feet. But before I proceed to the true and exact Way of meaſuring Timber, 'twill be beſt to make an end of the falſe Way, which loudly cries out for Redreſs from our Legiſlators.

THE ſeveral Quantities produced by theſe three ſeveral Dimenſions, are as following.

	Solid Feet.
The whole Piece K O, 24 Feet long, mean Girth 9 Inches, Quantity.	13 ½
The Fruſtum K N 16 Feet long, mean Girth 12 Inches, and Quantity.	16
The Fruſtum K L 8 Feet long, mean Girth 15 Inches, and Quantity.	12 ½

Now let us meaſure by the ſame Method, the Fruſtum or Top L O, firſt entire in one Dimenſion, and afterwards at twice ſuppoſing it to be cut off at N.

The

The mean Girth of L O at N is 6 Inches,
Multiplied by its ſelf, 6

Produces 36 the mean Area in ſquare Inches, between Butt and Top.

The Length of the Piece is 16 Feet,
Being multiplied by 12

32
16

Product 192
the Length in Inches, which multiply by 36.

192 the Length.
36 the mean Area.

1152
576

Product 6912 the ſuppoſed ſolid Inches in the whole Piece.

Now (as before) divide this Product by a ſolid Foot.

1728) 6912 (4 ſolid
6912

0000 Remains.

Hence it appears, that the Top L O contains 4 ſolid Feet exactly.

Now let us cut it in two in the middle at N, and meaſure each Part by it ſelf. For tho' the whole is always equal to its Parts, in all mathematical Operations, yet the Quantities produced by the Menſuration of theſe two Parts, by the ſame Rule, will be found to be otherwiſe.

We will firſt meaſure the Fruſtum L N, whoſe mean Girth in the middle at M, is 9 Inches; which being multiply'd by 9

Produces 81 ſquare Inches for the mean Area.

The

THE Length being 8 Feet, is equal to 96 Inches.

81 the mean Area.
96 the Length.

486
729

7776 the ſuppoſed ſolid Inches, which divide by a ſolid Foot

1728) 7776 (4 ſolid Feet.
6912

864 ſolid Inches, equal to ½ of one ſolid Foot.

☞ SEE here this one Fruſtum L N, meaſures to half a ſolid Foot more than both Fruſtums did before, when meaſured together, they both meaſuring but to four ſolid Feet, and this one meaſures to four ſolid Feet and half, excluſive of N O.

Now again, we will meaſure the Fruſtum N O, and ſee what that contains. The mean

Girth thereof in the middle is 4 Inches,
which being multiply'd by it ſelf. } 4

16

Produces 16 ſquare
Inches, the mean Area, which multiply by the Length } 96 Feet.

96
144

Product 1536 the ſuppos'd ſolid Inches; which is almoſt one ſolid Foot.

Theſe three laſt Operations ſtand thus.

The ſolid Content of the whole when meaſured at once } 4 ſolid Feet.

The Solidity of the Fruſtum L N } 4 ½

The Solidity of the Fruſtum N O almoſt } 1

Sum of the two Parts almoſt 5
which is almoſt one ſolid Foot, more than the whole meaſured to.

☞ Now

☞ Now ſeeing that the whole is ever equal to all its Parts taken together; 'tis demonſtratively plain, that this Method is abſolutely falſe, and ſo much, that whoever ſells Timber by this common Way of Meaſuring are certain of being very greatly injured. 'Tis plainly proved, that when this whole Piece of Timber was meaſured by one Dimenſion, its Quantity was found to be but 13 ½ ſolid Feet; whereas by being meaſured in three ſeveral Lengths, its Quantity is found to be 23 ⅛ ſolid Feet, which is 10 Feet ½ difference.

	Solid Feet.	
The whole meaſured together	13	½
The Fruſtum K L meaſured ſingly	12	½
The Fruſtum L N meaſured ſingly	4	½
The Fruſtum N O meaſured ſingly almoſt	1	
Their Quantities taken together,	18	
The Difference of the Parts taken together from the whole.	4	½

Solid Feet.

And again, this Difference of 4 ½ ſolid Feet is not all; for by and by, I will make it plainly appear, that there is actually very near 4 ſolid Feet more, that yet ly conceal'd:

ceal'd: So that the true Quantity of this Piece of Timber, will be found to be very near 22 Feet, inſtead of 13 Feet ½, which it was meaſured to, according to the uſual and cuſtomary Way of Meaſuring.

THIS being well underſtood, we have now no Room to wonder how Timber-Merchants, Carpenters, *&c.* can afford to ſell Timber at the ſame Price *per* Load, as they bought it at, and get great Profits by it alſo.

THIS to many has been a Paradox; but herein 'tis explain'd: For ſuppoſe that a Carpenter had bought this Piece of Timber according to the common Method of Meaſuring, at one Shilling *per* Foot, and was to ſell it again by the ſame Method of Meaſuring, at the ſame Price, he would get 8 *s.* 6 *d.* clear by it, provided that he cut it into three Lengths, each 8 Feet, as herein ſuppoſed, and ſold them as their ſeveral Quantities then appear'd to be by Meaſure. For were Timber-Merchants, *&c.* to ſell their Timber entire, as they bought it, they could have no ſuch great Advantages in the Meaſure, (provided that they did not ſquare it, as they call it, *viz.* hew off a ſmall skirting of the Convexity, from four oppoſite Parts

Parts of its Curvature, whereby they become rather Octangular than Square): But this I ſhall explain in its Place). The greateſt Advantage then that the Buyer hath, when he ſells his Timber entire as he bought it, without cutting the Butt-ends off (as before explained) or ſquaring, is one fifth Part of the Quantity, or very near it, which he gains by ſelling it by the true and juſt Way of meaſuring it, as he ought to have bought it by, to deal fairly.

☞ In my Paſſage through this Diſcovery, I have once or twice promis'd to prove, that even when the Dimenſions of Timber are juſtly taken, that their Quantities then produced, are above one fifth leſs than the real Quantity: So that what by their unjuſt Manner of taking the Dimenſions when they have an Opportunity, and their unjuſt Method that they meaſure by, the Seller is ſure of being defrauded of very near (and oftentimes more than) the one half thereof.

This notorious fraudulent Method, is as follows.

Suppose that the Girth of a Piece of round Timber is four Feet, or 48 Inches, then one fourth Part thereof is 12 Inches; which they ſay is, (or take for) the Side of

a

a geometrical Square, whoſe Area, they ſuppoſe is equal to the Area of a Circle, whoſe Circumference is equal to the Girth; or if the Timber was cut in two at the Place of girthing, to the Area of either End.

But 'tis notoriouſly falſe, and what is well known to every one that's tolerably acquainted with the Elements of Arithmetick and Geometry; I will demonſtrate the Fact thereof.

A geometrical Square, whoſe four Sides are equal to 48 Inches, hath each Side equal to 12 Inches, and its Area to 144 Inches.

12
12

Product 144 the Area of a geometrical Square, whoſe Sides are ſeverally equal to one fourth of the Girth.

A Circle whoſe Circumference is equal to the Girth 48 Inches, hath its Area equal to 183 Inches, which is above one fifth Part more than the geometrical Square of the ſame Circumference. See the Work. But firſt we muſt find the Diameter of the Circle, for which this is the Analogy.

As

As 22 is to 7, so is the Circumference given to the Diameter required.

22 7 48 15 $\frac{1}{11}$.

7

22) 336 (15 $\frac{1}{11}$ Diameter required.
22

116
110

6 Remains, equal to $\frac{6}{22}$, or $\frac{1}{11}$.

Now having the Diameter given or known, find the Area. The Rule is as following.

SQUARE the Diameter, multiply the Product (always) by 11, and divide (always) by 14, and the Quotient will be the Area required.

The Diameter 15 $\frac{1}{11}$
15 $\frac{1}{11}$

75
15
4 $\frac{4}{11}$
4 $\frac{1}{11}$

Product 233 $\frac{2}{11}$ the Diameter squared.

Brought

Brought over 233 $\frac{1}{11}$

Multiply by 11

233

233

2

Divide by 14) 2565 (183 $\frac{3}{14}$ — The Area of the Circle, whose Circumference is equal to 48 Inches.

14

116

112

45

42

3 Remains.

Now, if to 144, the Area of the Square, we add one fourth Part thereof, *viz.* 36, the Sum will be 180, which is 3 less than 183, the Area of the Circle: Hence it plainly appears, that the Difference is above one Fifth.

For as 144, the Area of the Geometrical Square is to 183, the Area of the Circle,

(leaving

(leaving the Fraction $\frac{1}{4}$ out). So is 4 to 5 and $\frac{1}{12}$.

144; 183 :: 4. 5. $\frac{1}{12}$

183

144)732(5. $\frac{1}{12}$

720

12 Remains, which is equal to $\frac{1}{12}$: But we will reject the Fraction $\frac{1}{12}$, and then the Analogy will be *as* FOUR *is to* FIVE. QED.

I having thus demonſtrated, that the Area at the Place of girthing is a full fifth more than it is meaſured to; it therefore follows, that all Quantities ſo meaſur'd are a full fifth more than they are meaſur'd for, and even when their Dimenſions are juſtly taken: But when Tricks are play'd therein, then God knows how far their Knavery may extend.

IN the ſmall Precedents preceding, I prov'd, how by the Deceit of taking the Dimenſion of the Piece K O, at once, four Feet and half were loſt, even by their common Way of meaſuring, excluſive of the fifth Part wanting beſides, as before prov'd,

prov'd, which is four Feet more; for the true Solidity of K O is 22 ſolid Feet, and not 13 ½ as the common Way meaſures it to.

For as 4 is to 5, ſo is the Quantity before found at three ſeveral Dimenſions, 18 to 22 ſolid Feet, the true Content thereof.

4, 5 : 18 : 22

Now, ſeeing that in the common Way of ſelling but one ſingle Stick of Timber, the Seller is defrauded of near two fifth Parts; it therefore follows, that where great Sales of Timber have been ſold, the Sellers have ſuſtain'd very great Loſſes, unknown to them.

The ſeveral Calculations here made, being arithmetically performed, I will now (according to my Promiſe) proceed to ſhew how the ſame may be performed inſtrumentally, by the double Line of Numbers (commonly called *Gunter*'s Line) on the ſliding Rule.

The Analogy for meaſuring Timber that is really ſquare, as the common Method ſuppoſes it to be, is as following.

The

As the Length of the Piece in Feet, accounted on the Slip of the Rule, is to 12 in the Girth Line, on the Rule; ſo is the fourth Part of the Girth in Inches and Halfs, accounted on the Girth Line, to the Content on the Slip, in ſolid Feet. But,

The true Analogy for meaſuring Timber that is round, is the following.

As the Length of the Piece in Feet, accounted on the Slip, is to 10 ¼ in the Girth Line; ſo is the fourth Part of the Girth in Inches and Halfs, accounted on the Girth Line, to the Content on the Slip, in ſolid Feet.

N. B. That the firſt Analogy gives the Content of round Timber, according to the common erroneous Method, *viz.* one fifth leſs than the true Quantity; and the latter, the true and exact Quantity of round Timber, as it ſhould in Juſtice be meaſured, between Buyer and Seller.

To illuſtrate them, I will perform ſome Examples by both Analogies.

Let it be required to meaſure the Fruſtum L K, whoſe Length is 8 Feet, and mean Girth 15 Inches.

1ſt, By the erroneous Method.

PRACTICE.

SET 8 on the Slip, to 12 on the Girth Line, and againſt 15 on the Girth Line, ſtands 12 ½ on the Slip, the ſuppoſed Quantity required; and when Timber is really ſquare, then this laſt Number is the true Quantity required: But in this Example, 'tis ſuppoſed to be round, and meaſured as uſual. Now, we will meaſure the ſame Stick by the true Way.

2dly, BY the right Method that gives the true Solidity.

PRACTICE.

SET 8, (the Length in Feet) accounted on the Slip, to 10 ¼ — (inſtead of 12) on the Girth Line; and againſt 15 the mean Girth on the Girth Line, ſtands 15 ⅛ —, the true Quantity required, which is 3 ſolid Feet more than the erroneous Method produces, *viz.* one fifth Part.

EXAMP.

LET it be required, to meaſure (as aforeſaid) the Fruſtum L N.

1ſt, BY the erroneous Method.

PRACTICE.

PRACTICE.

SET 8, the Length accounted on the Slip, to 12 on the Girth Line, and againſt 9, the mean Girth accounted on the Girth Line, ſtand 4 ½ Feet, the Solidity required.

2*dly*, BY the exact Method.

SET 8, the Length accounted on the Slip, to 10 $\frac{1}{7}$, (as in the preceding to 12) on the Girth Line, and againſt 9 the mean Girth accounted on the Girth Line ſtands 5, $\frac{1}{8}$, the Solidity required.

AND the like of any other Quantity whatever, that is either ſquare or round.

IF we have Occaſion to meaſure Timber, and have not a ſliding Rule, we muſt caſt up the Dimenſions, if the Timber is ſquared, as before delivered, by ſquaring the $\frac{1}{4}$ Girth; multiply the Product into the Length, and divide the laſt Product by 1728, the cubical Inches in one cubical Foot; the Quotient will be the Content required.

BUT if the Timber be round, then you muſt find the Area of a Circle, whoſe Circumference is equal to the whole Girth, as

before was ſhewn: Which Area being multiplied into the Length, and the Product divided by 1728, the Quotient is the Content required.

To make this intelligible and plain, I will meaſure the Fruſtum K L, after the true Method, arithmetically.

The Length is 8 Feet, and mean Girth at P 5 Feet, or 60 Inches.

ANALOGY.

As 22 is to 7, ſo is 60 to 19 $\frac{1}{11}$

7

22) 420 (19 — The Diameter of the Circle requir'd, whoſe Circumference is equal to the Girth given.

22

200

198

2 — Remains, equal to $\frac{1}{11}$

Having thus made known the Diameter, we muſt now proceed to find the Area of

of the Circle, not but that we might have done that, without finding the Diameter; but I think 'tis not ſo eaſy a Method, and therefore I recommend the finding of the Diameter, before we proceed to find the Area. This being done, proceed to find the Area as follows: *Firſt*, Square the Diameter $19 - \frac{1}{11}$.

$$\begin{array}{r} 19 - \frac{1}{11} \\ \hline 171 \\ 19 \\ \hline 361 \\ 3 - \frac{5}{11} \\ \hline \end{array}$$

$364 = \frac{5}{11}$ The Diameter ſquared. Which multiply by 11.

$$\begin{array}{r} 364\ \frac{5}{11} \\ 11 \\ \hline 364 \\ 364 \\ 5 \\ \hline \text{Product } 4009 \end{array}$$

Divide 4009 by 14, and the Quotient will be the Area of the Circle required.

```
14)4009(286
   28
   ---
   120
   112
   ---
    89
    84
    --
     5  Remains, equal to 5/14.
```

Now, multiply 286 5/14, by 8 Foot, *viz.* 96 Inches, the Length given.

```
286 5/14
   96
  ----
  1716
 2574
   34 — 5/14
 -------
 27490 — 5/14  The Solidity in Inches.
```

THIS

THIS Solidity in Inches divide by 1728 and the Quotient is 15 $\frac{1}{8}$, the Content in Feet required.

1728)27490(15 ſolid Feet.
1728

10210
8640

1570 ſolid Inches remain, which are nearly equal to a ſolid Foot.

Now, here we'll ſee, that this Piece of Timber, by taking in all the Fractions, as I went on in the Calculation, makes the Quantity thus performed arithmetically, to exceed the Quantity that the ſame Piece meaſur'd to, when meaſured inſtrumentally, by the ſliding Rule, almoſt Half a Foot. But ſince that the Cuſtom in purchaſing Timber is never to mind ſuch ſmall Trifles, 'tis not worth our Notice.

N. B. THAT if the Bark is on Timber, when 'tis meaſured, the Cuſtom is, to allow one Inch out of the $\frac{1}{4}$ of the whole Girth for it, *viz.* if the one Fourth of a Girth is found to be nine Inches, then one

Inch is abated, and the Girth is reckoned at eight Inches only: But I muſt adviſe, that this Cuſtom be no longer allowed on by the Seller, for 'tis greatly to his Loſs.

☞ OBSERVE the following Operations.

SUPPOSE that the Bark is on the Butt-End K L, whoſe mean Girth is 60 Inches, and the Area thereof 286 ſquare Inches, as in the laſt Page.

NOW, according to Cuſtom, abate one Inch out of the fourth Part of the Girth, *viz.* out of 15 Inches; then the Remainder will be 14 Inches, which taken 4 Times for the whole Girth, is 56 Inches. Now,

As 22 is to 7, ſo is 56 to 17 $\frac{4}{7}$. The Diameter without the Bark

$$\begin{array}{r} 17 - \frac{4}{7} \\ 17 - \frac{4}{7} \\ \hline 119 \\ 17 \\ 32 \\ \hline 321 \end{array}$$

The Diameter ſquared.

321
11

321
321

14)3531(252

square Inches the Area, when four Inches are abated in the Circumference, and the remaining Girth measured as a Circle, whose Circumference is equal thereto.

28

73
70

31
28

3

If we consider, that when one full Inch is abated from the Surface, all about the Tree, or if the Bark is actually one Inch in Thickness; then the Tree, when the Bark is taken off, must be two Inches less in its Diameter; so that the Frustum or Butt K L, with its Bark on, being then

19 $\frac{1}{11}$ Inches Diameter, is but 17 $\frac{4}{11}$ Inches when disbarked.

WE will now ſee what the Area at the mean Girth is, when the Bark is taken off.

Diam. 17 — $\frac{1}{11}$
17 — $\frac{3}{11}$

119 —
17
3 — $\frac{7}{11}$

292 — $\frac{1}{11}$ The Diameter ſquar'd, which

Multiply by 11

292
2921

14) 3213 (229 { ſquare Inches the Area, when two Inches are abated in the Diameter of the whole, for the Thickneſs of the Bark.

28

41
28

133
126

7

By

By theſe two laſt Calculations it appears, that when four Inches are allowed in the whole Girth, *viz.* one Inch in the $\frac{1}{4}$, the Area of Timber is 252 Inches: But when two Inches are abated in the Diameter, *viz.* one Inch at each Extreme, for the Thickneſs of the Bark; then the Area is but 229, which is 23 Inches leſs than the firſt: So that herein the crafty Buyer is a Loſer.

But this never happens, when Timber is meaſured after the cuſtomary Method, the Allowances therein being ſo very extravagant.

For ſuppoſe the mean Girth of K L to be ſeventeen Inches, excluſive of the Bark, then according to the cuſtomary Way of meaſuring, its Product is 289 ſquare Inches, and not 366, being conſidered as the Circumference of a Circle, equal thereto: See the Calculation.

17 { The fourth Part of the Girth, allowing 1 Inch for Bark.

17

119

17

Product 289 { ſquare Inches, the Area at the Girth.

But this Diameter being truly calculated, as Page 250, the true Area of Timber at the Girth is, } 342 $\frac{6}{7}$

By this laſt Account, after the uſual Method, it is but } 389

The Difference is Solid Inches. 053 $\frac{6}{7}$

If we multiply 53 $\frac{6}{7}$, the Difference by 96, the Length, the Product gives 5120 $\frac{6}{7}$ ſolid Inches, which is the real Loſs in the Butt-End K L, when 'tis meaſur'd with the Bark on, after the common Method, which is three ſolid Feet, wanting but 64 Inches; that is, the $\frac{1}{27}$ Part of a Foot.

From

FROM what I have here deliver'd, it apparently appears, that to fell Timber by the common Method of meaſuring, (as 'tis falſly termed,) the Seller, by the ſeveral Frauds therein, is actually cheated out of a full Half of the Quantity that he ſells. Is not this a Shame? does not this vile Practice deſerve the Conſideration of his moſt Sacred Majeſty and Parliament, to put a final End thereto, that Honeſty may take Place for the future, and be no longer a Skreen to Knavery, where nothing but Frauds and Villany are acting?

THIS I ſubmit to the Conſideration of all our worthy, learned, and judicious Gentlemen of *Great Britain*, who have been, and are the only Sufferers by this long practiſed Villany; and as I am here inviting them to the Propagation of Timber on their ſeveral Eſtates, to their very great Improvements, by undeniable Reaſonings and Proofs, I thought it my Duty to declare the Facts of the many Frauds uſed in buying of Timber; that hereafter, when their Plantations arrive to Maturity, they may reap the full Benefits of their Produce, according to my Calculations here humbly offered, and not be defrau-

ded out of one Half thereof, for Want of juſt Menſurations.

In my Calculation of the great Advantages that would ariſe from Plantations of Elm, it is there prov'd, that one Thouſand Acres planted with Elm, (as there directed) will, in twenty Years Time, produce 84439 Pounds neat Profit, clear from all Outgoings. Now, would not it vex any Gentleman, that in ſelling of this Timber by common Meaſure, he ſhould be bit out of half the Quantity, which is worth 42419 Pounds ten Shillings? I need not wait for an Anſwer to this Queſtion, it being natural to think, that every one who knows, will undoubtedly take all poſſible Care to prevent it.

To conſider how long a Time this baſe and vile Method has proſper'd, and how many bright ingenious Mathematicians have been bred in *England*, that dayly have been and are concerned in the Menſuration of Timber, (who undoubtedly knew the Frauds therein); 'tis very ſurpriſing, that no one among them would (for the common Good) take the Pleaſure of making a publick Declaration thereof, (as I have here done) which is doing no honeſt Man any

Sort

Sort of Injury, and I hope no ſmall Service to my Country in general.

And as our late Parliament thought it neceſſary to make an Act, forbidding the making of Bricks, under the Standard Size, and without Mixtures of Sea-coal Aſhes (call'd *Spaniſh*) therein, which they wiſely conceived was prejudicial to the Subject: So I make no Doubt, but that this our new Parliament will, upon a mature Conſideration hereof, enact, that for the Future, whatever Quantity or Quantities of Timber is, or are meaſured by any Perſon or Perſons that aſſume the Practice of meaſuring, (who ſhall mark after the uſual Manner, with his own Hand, before Evidence, the Contents); and the Content or Contents by him or them warranted, are actually conſiderably leſs than the true ſolid Content or Contents afterwards found upon a juſt Menſuration thereof; that the ſaid Meaſurer or Meaſurers ſhall be proſecuted by the Party or Parties ſo grieved, as if he or they had felonioufly ſtole ſuch Quantities of Timber, as their Meaſurements given under their own Hands are leſs than the true and real Quantities in the Timber, by them (ſaid to be) meaſured.

But,

BUT, as Puniſhments for all Offences are conſidered, and executed by the Orders of our wiſe Legiſlators, I therefore ſubmit the whole to their better Judgments.

THE only Objections that any of the Buyers of Timber can make to this Reformation of the Meaſure of Timber, is, that before the Body is hew'd to a Square, there is a Waſte in the Chips and Slabbs, which are only uſeful for the Fire; and that the Expence of hewing is more than the Chips are worth. Now, all this I allow: I know, that when Timber is to be ſquared, there is ſome Loſs in hewing, and Expence alſo: But then, let an Allowance (that is reaſonable) be made in the Price *per* Load, and not in the Meaſurement; for then the Seller knows what he is doing, as well as the Buyer, which he knows nothing of, when he is deceiv'd in the Quantity. Beſides, 'tis very often ſeen, that round Timber is never ſquared, and conſequently has no Loſs by hewing, as when uſed for Pipes to convey Water, and for Pumps, *&c.*

THE Motives that moved me to this Declaration being fully declared at large, in

many

many of the preceding Pages, are thus in Brief.

Firſt, By the deceitful Method of leaving on the ſmall Tops to a great Length, under a Pretence of making the Quantity the greater; 'tis greatly diminiſh'd thereby, which is prov'd by K O, that is, 24 Feet long, mean Girth, in the Middle 9 Inches, and Quantity 13 ½ ſolid Feet. Whereas if from the ſame Piece at the Butt, 8 Feet in Length only be cut off, or meaſured by its ſelf, the real ſolid Content thereof (excluſive of the remaining Top L O, which is 16 Feet long) is 12 ½ Feet, which is but one Foot leſs than the whole meaſured together.

Secondly, By the Allowance of an Inch, out of the fourth Part of the Girth, 'tis plain, by the preceding, that ſuch an Allowance being made, in the Menſuration of the Butt K L, there is a very great Loſs to the Seller, when Quantities are very large.

Laſtly, It has alſo been proved, that when the Dimenſions of Timber are truly taken, yet if they are caſt up, after the common Method, the Quantity produced is leſs than the true Quantity, by

ſomething more than a full fifth Part. All which Practices ſum'd together, are fully ſufficient to prove the Neceſſity of a ſpeedy Reformation in the Menſuration thereof; and there's no Doubt, but this publick Grievance will be timely redreſs'd, to the great Advantages of eſtated Gentlemen and Landholders; as that of uſing Sea-Coal Aſhes in Brick-earth, to the great Prejudice and early Decay of Buildings, when uſed in too great a Quantity. But new Buildings do ſoon decay, and oftentimes fall to the Ground, before they are finiſh'd, when they are built with the ſoundeſt Bricks that can be made, where Workmen have not ſufficient Quantities of Timber for Lentils, *&c.* to bind the Work together; or when they are not allowed to make the Walls of ſufficient Thickneſs, to ſupport the Weights of the ſeveral Floors and Roof.

In theſe Caſes the very beſt Workmen and Materials may fail, as well as when the *Spaniſh* is work'd into Brick-earth in too great a Quantity, which, in burning, burns the very Life and Strength of the Earth to nothing, whereby they are incapable of ſupporting their own Weights: But when

Spaniſh is moderately mix'd with Brick-earth in the making, and the Earth of a good Kind; thoſe Bricks ſo made, are much ſtronger, and of a longer Duration, than others that are made of the ſame Earth, and burnt in the ſame Manner, without a moderate Mixture therein. For Bricks made of Earth only, as the late Act directs, cannot be ſo throughly burnt, as thoſe that have a moderate Mixture of Aſhes, which burns within the Brick, proportionably to the circumſcribing Heat about them. For altho' that in Brick-earths there is contain'd great Quantities of Oil, and conſequently Sulphur alſo; yet 'tis in ſo ſmall a Quantity, to what is required, that before the middle Parts of a Brick can be half burnt, the out Parts are ready to run into a liquid Maſs, (called Clinkers). And if the Heat is ſo proportion'd as to burn the out Parts of the Brick no more than they ſhould be, then the middle Parts are ſcarcely more than half burnt. This I thought neceſſary to recommend to the Conſideration of thoſe whom it may concern, and beg Pardon for the Digreſſion.

I will now proceed to exhibit the Manner of placing the Dimenſions of Timber,

as they are taken at Meaſuring. That when you have any to meaſure, we may be ready therein, as well as to know when others are ſo alſo, that are ſent to meaſure againſt us,

THE Manner thereof is as following.

Round

Round Timber measured, September, 11. 1727. *for the Right Honourable the Earl of* ——— *at his Lordship's Wood, called* Bramble-wood, *in the Parish of* ——— *per* B. L. *of* Twickenham.

N.	Piec. Len. Feet	Inc.	Piec. Gir. Inches.		Sol. Contents after the usual Method. Load.	Fe.	Sol. Contents after the true Method. Load.	Fe.	Diffe. between the false and true Cont. Load.	Fe.
1	101	6	20		0	28	0	35 1/4	0	7 1/4
2	53	0	17		0	10 6/10	0	13 8/10	0	2 8/10
3	06	9	24		0	27	0	33 1/4	0	6 1/4
4	15	3	26	1/2	1	24 1/2	1	43	0	18 1/2
5	11	0	12		0	11	0	13 3/4	0	2 3/4
6	70	6	9	1/2	0	44	0	55 1/3	0	11 1/3
7	24	0	9		0	13 1/2	0	17	0	3 1/2
8	16	0	6		0	4	0	5	0	1
9	16	0	12		0	16	0	20	0	4
10	8	0	18	0	0	18	0	22 1/2	0	4 1/2
11	8	0	4	1/2	0	1 1/10	0	1 4/10	0	1/10
12	92	6	30	3/4	12	5	15	10	3	5
13	22	3	11		0	18 6/10	0	23 1/4	0	4 2/10
14	17	6	15	1/2	0	29	0	36 1/2	0	7 1/2
15	59	0	12	0	1	9	1	24	0	15
16	60	0	12	0	1	10	1	25 1/3	0	15 1/3
17	70	0	15	1/2	2	17	2	46	0	29
18	70	0	15	0	2	9 1/2	2	36 1/2	0	27
19	85	6	20		4	38	5	47	1	9
20	99	6	32	1/2	14	30	18	10	3	30
21	18		6	0	0	4 1/2	0	5 6/10	0	1 1/10
22	29	6	29	1/2	3	29	4	24	0	45
23	30	0	29	0	3	31	4	28	0	47
Sums	983	: 9	387	; 1/4	51	18	64	: 24	13	: 6

When we meaſure Timber by this new and exact Method, we need have on each Leaf of our Book but four Columns; the firſt denoting the Number of Pieces, the ſecond their Lengths, the third their Girths, and the fourth their Quantities.

But when we meaſure againſt a Meaſurer after the common Way, then 'tis neceſſary to have two other Columns, as here exhibited, to exemplify the Differences.

When we meaſure Timber that is hew'd we muſt be provided with a large Pair of Callipers, to meaſure the Thickneſs or Diameters of the Pieces in the Middle, between both Ends where we did before (in the round Timber) girth it. Which Thickneſs is always taken for the Sides of Squares, as the fourth Part of the Girths were before; and in like Manner multiplied into the Length for the Solidity.

But this is alſo a notorious Method; for all the Cants, or angular Parts that are wanting, to make the Timber perfectly ſquare, are meaſured in, and accounted for (tho' not there) as ſo much real Timber. By this Method, moſt Timber Merchants, and other Dealers, ſell the greateſt Part of their Timber; but few or any care to buy by

by it, except, when by deceitfully taking the Dimenſions, they can bite the Seller.

THE leaſt Loſs ſuſtain'd by buying hew'd Timber, if the Dimenſions are juſtly taken, is $\frac{1}{8}$ Part of the whole; but it very often happens to be $\frac{1}{6}$, $\frac{1}{5}$, and very often $\frac{1}{4}$ Part.

FINIS.

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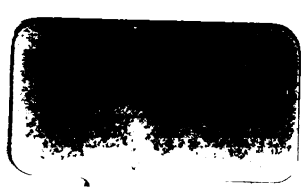
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